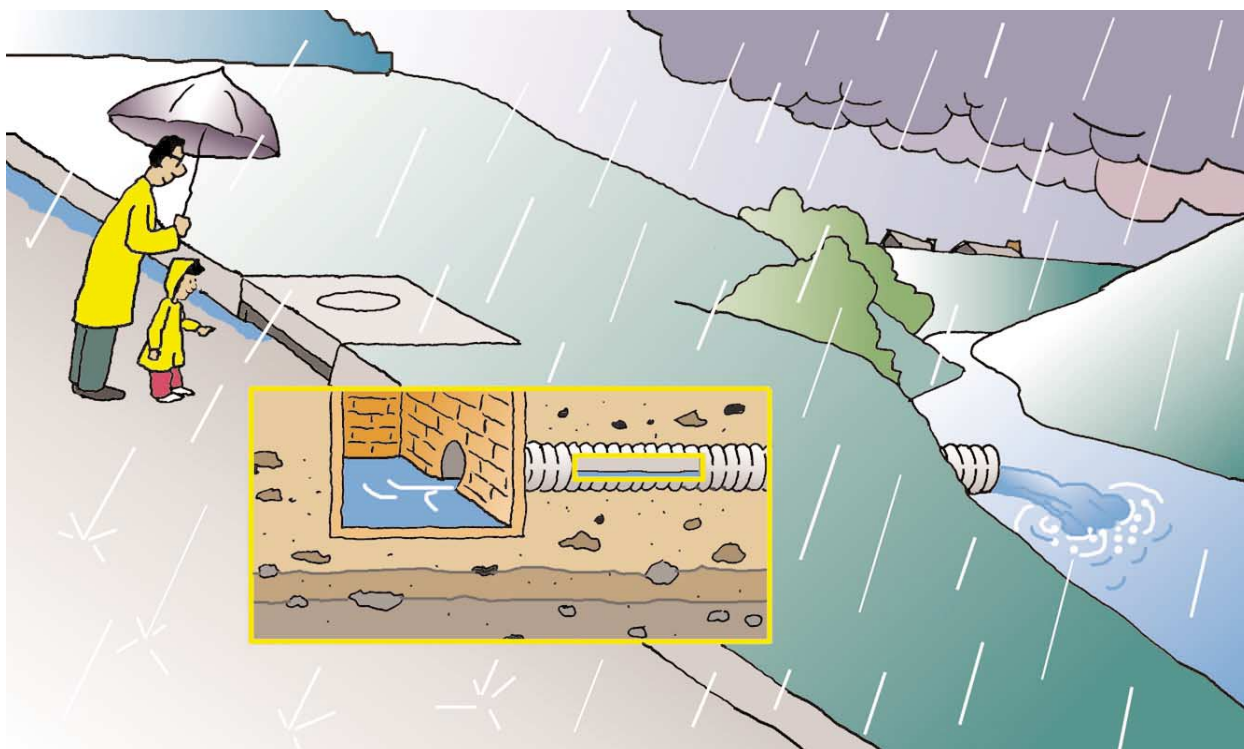


Annual Report NPDES Municipal Separate Storm Sewer System Permit



PUBLISHED BY THE MONTGOMERY COUNTY DEPARTMENT OF ENVIRONMENTAL PROTECTION
FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

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LIST OF ACRONYMS

| | |
|-------------|---|
| BMP | Best Management Practice |
| CIP | Capital Improvement Program |
| CSPS | Countywide Stream Protection Strategy |
| DEP | Department of Environmental Protection |
| DPS | Department of Permitting Services |
| DPWT | Department of Public Works and Transportation |
| GIS | Geographic Information System |
| MDE | Maryland Department of the Environment |
| SPA | Special Protection Area |

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LIST OF ATTACHMENTS

A. COMPACT DISK WITH THE FOLLOWING ELECTRONIC FILES

| | |
|-------------------------|--|
| MDENPDES01.mdb | Required information in ACCESS 2000 database. <i>Urban Best Management Practices</i> <i>NPDES Construction General Permits</i> <i>Erosion and Sediment Control Responsible Personnel Training Certification</i> <i>Illicit Discharge Program (and type codes)</i> <i>Chemical Monitoring Site</i> <i>Continuous Flow Monitoring</i> <i>Chemical Monitoring Storm Event Data</i> <i>Stormwater Programmatic Information</i> <i>Stormwater Implementation Information</i> |
| APPENDIX.doc | Annual Report Databases |
| QA_QC.doc | QUALITY ASSURANCE/QUALITY CONTROL FOR WATER CHEMISTRY MONITORING |
| SWP3 folder (doc files) | ANNUAL SITE ASSESSMENTS Colesville Highway Maintenance Depot Damascus Highway Maintenance Depot Equipment Management Operations Center (EMOC)/Gaithersburg Highway Services Gude Landfill Oaks Landfill Poolesville Highway Maintenance Depot Seven Locks Facility Silver Spring/Brookville Service Park Transfer Station/Materials Recycling Facility (TSMRF) |
| ROCKCREEKWRAP.pdf | ROCK CREEK WATERSHED RESTORATION ACTION PLAN |
| STREETSWEEPING.pdf | STREETSWEEPING FOR POLLUTANT REMOVAL |
| SENECAyear2001.doc | SENECA CREEK WATERSHED YEAR 2001 MONITORING |
| SENECAwwtp95-01.doc | SENECA CREEK WASTEWATER TREATMENT PLANT 1995-2001 MONITORING SUMMARY REPORT |

LIST OF ATTACHMENTS (continued)

B. SITE MAPS/PLANS for STORMWATER POLLUTION PREVENTION PLANS

Colesville Highway Maintenance Depot
Damascus Highway Maintenance Depot
Equipment Management Operations Center (EMOC)/Gaithersburg Highway Services
Gude Landfill
Oaks Landfill
Poolesville Highway Maintenance Depot
Seven Locks Facility/Bethesda Maintenance Depot
Silver Spring/Brookville Service Park
Transfer Station/Materials Recycling Facility (TSMRF)

C. ROCK CREEK WATERSHED RESTORATION ACTION PLAN

D. INTEGRATED PEST MANAGEMENT

Pest Management Policy and the April 2002 Pest Control and Pesticide Usage Guidelines
"Attachment B" Landscape Pest Control Program
Pesticide Usage for Calendar Year 2001

E. STORMWATER MANAGEMENT PROGRAM FUNDING

Revised MONTGOMERY COUNTY CODE Chapter 19 Article II.
Executive Regulation 11-00, Guidelines for Stormwater Management Loan Program
Water Quality Protection Charge Background Information

**MONTGOMERY COUNTY MARYLAND
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
MUNICIPAL SEPARATE STORM SEWER SYSTEM DISCHARGE PERMIT**

**Annual Report
August 2002**

I. BACKGROUND

This submission fulfills the requirement for an annual progress report to the Maryland Department of the Environment (MDE) as specified in Part V of Permit Number 00-DP-3320 MD0068349 (the Permit). The five-year Permit term began July 5, 2001, covering stormwater discharges from the municipal separate storm sewer system in Montgomery County, Maryland. Significant accomplishments in the County's stormwater management program during the 2001 calendar year are highlighted in the Overview. The report itself has been organized based on the headings in the Permit's Section III. to document how specific required elements of the County's stormwater management program are being implemented.

The Montgomery County Department of Environmental Protection (DEP) has primary responsibility for the majority of the requirements of the Permit, including interagency coordination, annual reporting, source identification, discharge characterization, monitoring, stormwater facility inspection and maintenance enforcement, illicit discharge detection and elimination, watershed public outreach, and watershed restoration plans. The Department of Permitting Services (DPS) is responsible for the County's Stormwater and Sediment and Erosion Control Program. The Department of Public Works and Transportation (DPWT) is responsible for storm drains, road and roadside maintenance, solid waste disposal, and the General Permit for Storm Water Discharges Associated with Industrial Facilities at the County-owned vehicle and road maintenance facilities.

II. OVERVIEW

Source Identification

The County continues to update and enhance its Geographic Information System (GIS) capabilities for source identification, natural resources mapping, and program tracking.

- During FY'03, the DPS will begin to develop and implement a process that will provide for routine, electronic updates of the County's storm drain system. This inventory is also being updated as field staff locate outfalls that have not been captured in the original inventory.
- The DEP is developing a comprehensive database with GIS mapping that includes all State information for NPDES permits for water, air, hazardous waste, and underground storage tanks.
- The DEP has computerized the drainage areas to all major stormwater management facilities (ponds) in the County and will be adding the drainage areas for the smaller facilities as part of the ongoing maintenance inspection process.

Discharge Characterization

The Permit requires that "Montgomery County shall contribute to Maryland's understanding of stormwater runoff and its effect on water resources by conducting a monitoring program."

- During 2001, the DEP began the transition for integrated water chemistry, biological, and physical habitat monitoring from stations in the Upper Paint Branch to those at the Stewart-April Lane Tributary outfall and Lower Paint Branch instream sites. The outfall location was selected to document the effectiveness of planned stormwater quality and quantity control for the highly developed drainage area.
- During the summer of 2002, the DEP began monitoring in the Clarksburg Town Center of the Seneca Creek watershed to evaluate the effectiveness of the State of Maryland 2000 Stormwater Design Manual. This monitoring will include quantitative stream habitat assessments, benthic and fish community sampling, and flow monitoring as the watershed is converted from agricultural to high density urban uses.

Management Programs

The County continues to implement management programs to control discharges from all areas served by the Montgomery County municipal separate storm sewer system. These include stormwater management facility inspection and maintenance, stormwater management permitting and plan review, sediment and erosion control enforcement, illicit discharge identification and elimination, stormwater pollution prevention plans for County-owned industrial facilities, and an extensive public outreach effort that encompasses all environmental aspects--water, air, and groundwater.

- The DEP continues to be the lead County agency for providing residents, business owners, and resource users with timely information on environmental issues. A wide variety of fact sheets, interest articles, and links to federal, state, and non-profit group web sites are available on the DEP web site (askdep.com). During 2001, the Environmental Partners Program was introduced, a comprehensive environmental inspection program with the goal of educating and involving businesses in pollution prevention and using environmentally friendly products.
- The County has adopted changes to its stormwater management ordinance to comply with the year 2000 State Stormwater Design Manual. All stormwater management concepts approved on or after June 20, 2002 must meet the new standards.
- During 2001, the DPWT updated the Stormwater Pollution Prevention Plans at the County-owned facilities covered under the General Permit for Stormwater Discharges from Industrial facilities. The DPWT has committed to maintaining routine inspection logs and to conducting annual site assessments to assure compliance with the General Permit requirements and the DPWT's commitments for the County's Environmental Management System.
- In Spring 2001, the County augmented its Pollution Prevention Program by committing five departments in a pilot study which involved training to develop and implement Environmental Management Systems (EMS) into their routine operations. An EMS emphasizes regulatory compliance, pollution prevention, and continual self-evaluation for improvement in environmental protection. The DEP, the DPWT, and the Fire and Rescue Service have made significant progress in identifying EMS objectives and targets and implementing procedures and policies for meeting those targets.

Watershed Restoration

The County is continuing its systematic assessment of water quality, stream resource conditions, and habitat modification within all of its watersheds. The County program integrates biological monitoring and physical habitat assessments with stormwater retrofit and stream restoration opportunities, water quality discharge law enforcement, and public outreach and involvement. This approach leads to pollution prevention and project construction efforts that are watershed-based and that will provide water quality benefits to the maximum extent practicable.

- About 40% of the County's total acreage, and the majority of its developed areas, have been covered under Watershed Restoration Studies begun since 1996. Total cost to date (including State and Federal cost-share funding) for watershed studies, stormwater retrofits, and stream restoration projects completed or in design has been \$21.2 million dollars. This includes 26 stormwater retrofit projects covering 4,444 acres and 51 restoration projects on 29.2 miles of impaired streams.
- The DEP has revisited the Seneca Creek Watershed in the second round of countywide baseline and reference stream monitoring. Fourteen of the 65 stations monitored showed impairment from excessive amounts of fine and coarse sediment. Follow-up recommendations include coordination with the City of Gaithersburg through the Phase 2 NPDES Permit Program.

- The County has selected the Turkey Branch Subwatershed in the Rock Creek Watershed for Permit-required assessment, potential project inventory, project implementation, and tracking of restoration progress.

Program Funding

During FY'02, the County spent \$8.589 million for these programs and has budgeted \$11.121 million for FY'03. Funding for watershed assessments, project identification, and project construction represent the single largest category of total expenditures, about 45% in FY '02 and budgeted to be about 49% for FY'03.

A significant funding milestone was reached on November 20, 2001 when the Montgomery County Council voted unanimously to pass Bill 28-00 and established the Water Quality Protection Charge (the Charge) to provide a consistent funding source for maintenance of privately-owned residential stormwater facilities. In the future, a wide variety of stormwater program requirements could be added for coverage under the Charge.

Assessment of Controls

The Permit requires an estimate of expected pollutant load reductions as a result of implemented stormwater management programs. For the year 2001, pollutant reductions from five major types of structural BMPs (dry ponds, extended detention ponds, wet ponds, infiltration devices, and separators/sand filters) ranged from about 16% for nitrogen to about 22% for phosphorus, heavy metals, and total suspended solids. Stormwater pollutant reductions associated with other structural practices are not expected to significantly increase these percentages. Stream restoration and non-structural practices such as pollution prevention and public outreach will be taken into account as quantitative data becomes available from ongoing research.

During the last Permit period, the County used the results from its Special Protection Areas (SPAs) to assess BMP effectiveness for minimizing development impacts on streams. In the Piney Branch SPA, the data seem to already be showing development-related, nutrient impacts on stream resource conditions. The County has begun nutrient monitoring at a network of stations throughout the Piney Branch SPA to identify any specific areas, and their land uses, that are contributing to this eutrophication problem.

Analysis of data from the Upper Good Hope showed that while stormflow contributions provided the majority of particulate-associated pollutants, baseflow contributions of nitrogen constituents represented 74% of the total annual load. Pollutant control strategies will therefore need to consider baseflow contributions as well as storm-carried loads. The County has now begun more detailed evaluations of groundwater, the principal contributor to baseflow, as a follow up to The Groundwater Protection Strategy (November 2001). This includes the development and implementation of a groundwater monitoring program that will be crucial in protecting groundwater supply, groundwater quality, and stream baseflow conditions.

III. STANDARD PERMIT CONDITIONS

A. Permit Administration

Montgomery County provided MDE with required contact information and organization chart in January 2002. That information remains current.

B. Legal Authority

In January 2002, Montgomery County submitted the required legal recertification of its authority to regulate water quality in discharges from its storm drain system.

C. Source Identification

C1. Geographic Information System (GIS) Data Layers

Montgomery County continues the development and updating of its geographic information system (GIS) data layers. Examples showing geologic features, land use, resources, infrastructure, and significant discharges have been submitted with previous annual reports as required.

C2. Storm Drain System Drainage Areas

The County submitted its storm drain inventory and associated data layers as of October 1998 in the 1999 Annual Report. The DEP is also locating and mapping additional storm drain inlets by using high resolution aerial photographs and already mapped system components to trigger field investigations to locate and map missing connecting pipes. The inventory is also being updated as field staff locate outfalls that have not been captured in the original inventory.

The DPS received \$100,000 in its FY' 03 budget to bring a consultant on board to update the existing GIS Storm Drain Inventory Database. In addition, the DPS will either use either in-house personnel or personnel from the Department of Technology Services (at cost to DPS) to perform the maintenance of the database. The DPS is now actively pursuing the needed steps for compliance with the County permit requirement. This will include submittal requirements for future storm drain system to facilitate the electronic update process.

C3. Mapping of New Pollutant Sources

Development of a Comprehensive Permit Data Base

The DEP is in the process of developing a comprehensive database that will allow access to all state and local permits. This database will have all State permit information for NPDES, air, hazardous waste, and underground storage tanks. Eventually this database will incorporate the local emergency planning database and reoccurring discharge points using GIS and global positioning satellite technology. This database will be available during late 2002.

C4. Urban Best Management Practices

As required by the permit, stormwater management facility construction completion data are included in the database on the CD in Attachment A. There are 2,525 records in this database, each representing one site and not the treatment chain of structures that may be present. When individual structures are counted, there are more than 3,000 best management practices (BMPs) in the County due to the common use of runoff pre-treatment (like sand filters) prior to the pond or wetland final treatment structure. Every structure has its own inspection and maintenance records kept in the County's Stormwater Management Facility Maintenance Database.

The database in Attachment A uses the format for the MDE's Urban BMP Database (included in electronic format on the CD). Much of this information remains missing for facilities constructed prior to the County's first NPDES MS4 Permit (1996) due to loss of the paper records associated with those sites. As part of the County's Maintenance Inspection Program Contract, drainage areas to the facilities are being computerized. As of July 2002, drainage areas to all of the major facilities (ponds) have been delineated, but many of the smaller facilities (particularly those on commercial or industrial sites) still lack this information.

D. Discharge Characterization

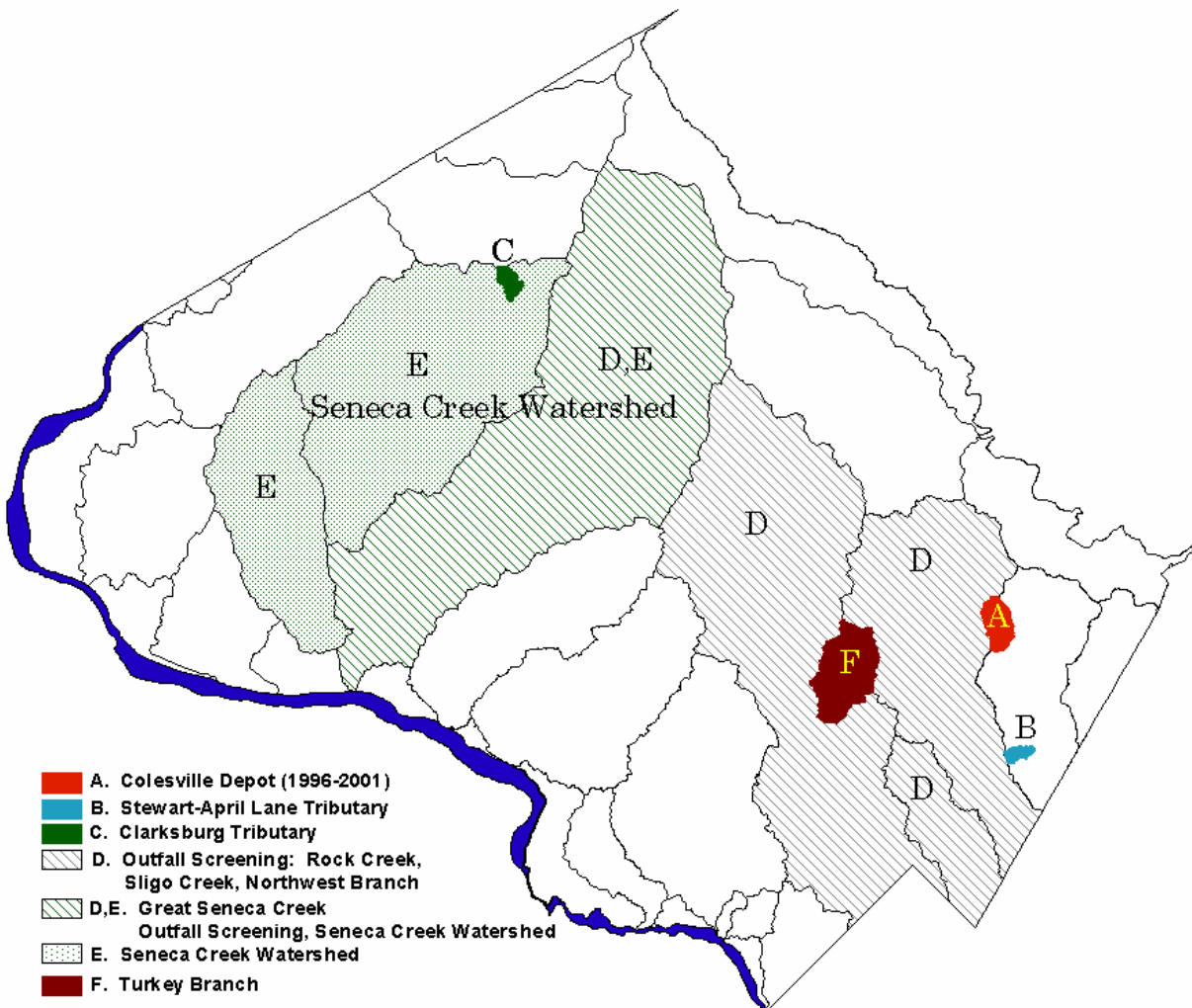
The permit requires that "Montgomery County shall contribute to Maryland's understanding of stormwater runoff and its effect on water resources by conducting a monitoring program." The County's monitoring programs include elements required in Permit Sections III. D. Discharge Characterization, III. E. Management Programs, and III. F. Watershed Restoration. The locations of the County stations and watersheds in which Permit-required monitoring took place during the year 2001 are shown in Figure III-1.

D1. Outfall and Instream Monitoring

There was a transition during the year 2001 from the Colesville Depot and Good Hope sites (location A in Figure III-1) monitored for the previous Permit and the Stewart-April Lane and mainstem Paint Branch sites (location B in Figure III-1) to be monitored during the current Permit. The long-term permit monitoring work is done under contract, which had to be competitively bid under County Procurement requirements. The contract with Versar, Inc. for the new Permit monitoring was executed in January 2002. Monitoring results for the Stewart-April Lane and mainstem Paint Branch stations will be included in the Annual Report for 2002.

The outfall station is located on the Stewart April Lane Tributary 200 to 300 feet downstream from the area of a proposed stormwater retrofit for the highly urban drainage area. Versar, Inc. conducted pre-retrofit construction monitoring at this same site in 1998-1999 under contract to the U.S. Army Corps of Engineers (USCOE). The instream station is on Paint Branch approximately 200 feet below the confluence of Paint Branch and the Stewart April Lane Tributary.

FIGURE III-1. Stations and Watersheds for Permit Required Monitoring during 2001.



Section III-D. Discharge Characterization

- A. Colesville Depot Outfall and Upper Good Hope Tributary. Paint Branch. Long Term Monitoring. 1996-2001.
- B. Stewart-April Lane Tributary and Paint Branch Mainstem. Long Term Monitoring beginning in 2002.
- C. Clarksburg Special Protection Area. Little Seneca Creek Watershed. Design Manual Monitoring.

Section III-E. Management Programs

- D. Outfall Screening: Rock Creek, Sligo Creek, Northwest Branch
- D,E. Great Seneca Creek: Outfall Screening, Seneca Creek Watershed Assessment

Section III-F. Watershed Restoration

- D,E. Great Seneca Creek: Outfall Screening, Seneca Creek Watershed Assessment
- E. Seneca Creek Watershed. Watershed-wide assessment for water quality conditions and impairments during 2001.
- F. Turkey Branch in Rock Creek. Retrofit and Restoration for uncontrolled impervious areas.

D2. Stormwater Design Manual Monitoring

In March of 2002, the MDE approved the site and approach proposed for the Montgomery County monitoring of the 2000 stormwater design manual effectiveness. Background information was submitted to MDE in January 2002. The watershed is in the Clarksburg Town Center (location C in Figure III-1), in a drainage area that will be built-out to a high percent imperviousness but subject to the County's more stringent review and performance goals for a Special Protection Area.

During June of 2002, DEP staff completed a longitudinal survey of the selected stream. Almost one mile of stream was surveyed. The lengths and slopes of all major fluvial features (riffle, run, and pool) were surveyed and recorded. The results have been graphed and the stream segmented into five sections, each with distinct slope and fluvial characteristics. The DEP is now locating all proposed SWM outfall locations within the sections so that cross sections can properly be placed. After the cross-sections are completed, at least one longitudinal survey will also be established to evaluate geomorphic features such as sinuosity, bankfull elevation, and bedload characteristics. This additional field work will be completed in the fall of 2002.

D3. Permit Monitoring Activities during 2001

The first samples for the long-term discharge characterization required at Stewart-April Lane (outfall) and in Paint Branch (instream) were taken in May 2002. No data for the Stewart-April Lane/Paint Branch monitoring is included with this submission.

Flow monitoring, baseflow, and storm event water chemistry data collected during 2001 for the Colesville Depot and Upper Good Hope Instream stations are included in the database submitted on the CD in Attachment A. During 2001, laboratory analyses were conducted for eight baseflow samples (January through August) and three storm events (January-March). A combination of equipment problems and extended drought led to the termination of water chemistry monitoring in September 2001.

Water Chemistry

The Stewart-April Lane Tributary site was selected in part because of planned stormwater quality and quantity control for the highly developed contributing drainage area. Enclosed in electronic format on the CD in Attachment A is the Quality Assurance and Quality Control Document (QA/QC) for Water Chemistry Monitoring for the County's program. This contains detailed information on the stations, sampling equipment and protocols, database management, and contact information for field, laboratory, and County management staff. The QA/QC includes the Permit-required parameters, number of storm events and seasonal coverage, and baseflow sampling.

The Washington Suburban Sanitary Commission (WSSC) is performing the Permit-required Laboratory Analyses under contract to the DEP. Table III-1 lists these parameters, methods, and method detection limits, and indicates the availability of USCOE pre-construction data for comparison. The USCOE data will be used along with the Permit-required data to characterize the uncontrolled runoff from the subwatershed and to contrast with post-construction results.

Continuous flow measurements are being conducted at both the outfall and instream sites. There were concerns about possible vandalism in the open areas closest to the monitoring stations so the tipping bucket rain gauge was established at the WSSC Laboratory Facility, only about a mile directly north of the monitoring sites.

TABLE III-1. Permit-required Parameters, Methods, Methods detection limits, and Monitoring by USCOE for Long-Term Discharge Characterization.

| Parameter | WSSC* method | WSSC MDL | USCOE (1998-1999) |
|---|----------------|------------|-------------------|
| Fecal Coliform | SM9221 B | 1.1/100 mL | ✓ |
| BOD 5 Day | SM 5210 B | 1.0 mg/L * | |
| Hardness | SM2340 C | 1.0 mg/L * | |
| Nitrate+Nitrite | L10-107-04-1-A | 0.015 mg/L | ✓ |
| TKN | L10-107-06-2-D | 0.08 mg/L | ✓ |
| Total Petroleum Hydrocarbons | EPA 1664A | 5.0 mg/L | |
| Total Phenols | EPA 420.1 | <0.01 mg/L | |
| Total Phosphorus | L10-115-01-1-E | 0.021 mg/L | ✓ |
| Total Suspended Solids | SM 2540 D | 1.0 mg/L | ✓ |
| Total Cadmium | EPA 200.8 | 0.6 µg/L | |
| Total Copper | EPA 200.8 | 1.2 µg/L | ✓ |
| Total Lead | EPA 200.8 | 0.4 µg/L | |
| Total Zinc | EPA 200.8 | 3.4 µg/L | ✓ |
| * Most currently available, SM=Standard Methods, L=Lachate Instrument Methods, and EPA=Environmental Protection Agency USCOE=United States Army Corps of Engineers | | | |

Biological and Physical Habitat Monitoring

As required by the Permit, stations for biological monitoring have been established for the outfall and instream sites. These stations are close to Paint Branch locations which DEP had monitored during 1995 as part of the Countywide Baseline Monitoring Program. The DEP protocols approved by MDE during the previous Permit will be used, including spring Benthic Macroinvertebrate Sampling, summer Fish Sampling, and fall Quantitative Physical Habitat Assessments.

The Physical Stream Assessment will include stream channel cross-sections, annual comparisons of the stream profile, and habitat assessments using the DEP Rapid Habitat Assessment method. Hydrologic model analysis has been conducted for the outfall station for pre-development and existing conditions, and will be conducted for the Paint Branch down to the instream monitoring station before the next Annual Report Submission.

E. Management Programs

E1. Stormwater Management Program

Facility Inspections and Maintenance

The County has made major progress in accelerating its inspection of and increasing maintenance at privately and publicly owned stormwater management facilities. Funding for the inspection program is expected to continue at previous levels. In 2001, contractors working for DEP made 788 inspections. DEP field staff made 1294 inspections which include consultative inspections as well as interim repair and final approval inspections.

Underground storage structures and water quality inlets comprise a large part of the facilities inspected during the last year. A majority of the ponds have been inspected and will not need to be inspected until 2002 when the three-year inspection cycle begins again.

Stormwater Management Ordinance and Implementation

The County is in the final stages of modifying its existing ordinances, regulations, and administrative procedures to accommodate implementation of the 2000 Maryland Stormwater Design Manual. Bill No. 45-01, Stormwater Management Requirements, was introduced to the County Council on December 11, 2001; enacted on March 12, 2002; signed by the County Executive on March 21, 2002; and became effective June 20, 2002. Executive Regulation 7-02 was advertised in the Montgomery County Register on April 1, 2002 and submitted by the County Executive to the County Council on May 31, 2002 for enactment by July 31, 2002.

The County has been using the 2000 Design Manual since June 20, 2002 when the changes went into effect. All stormwater management concepts approved on or after that date must meet the standards of the 2000 Design Manual. All previously approved stormwater management concepts are valid until July 1, 2003. All previously approved residential lots of two acres and greater remain exempt from stormwater management requirements if sediment control permits are issued for the

lots prior to July 1, 2003. Given the very recent start of implementation of new design manual criteria, there are no current problems to report.

The Permit requires tracking of stormwater management concept plans approved during the reporting year. Permit information is shown in Table III-2 and in the database on the CD in Attachment A. The Permit requires that number of waivers be reported, but not the actual acreage of new development represented in those waivers. For the year 2001, waivers of quantity control amounted to only 6.5% (108 acres) of the total nonexempt land area for projects submitted for approval. Likewise, waivers of water quality control only amounted to 2.3% (37 acres) of the total area of submitted projects. In the past, the numbers of waivers granted were given a greater amount of attention than warranted from the actual amount of land affected.

TABLE III-2. Permit-required Stormwater Programmatic Information.

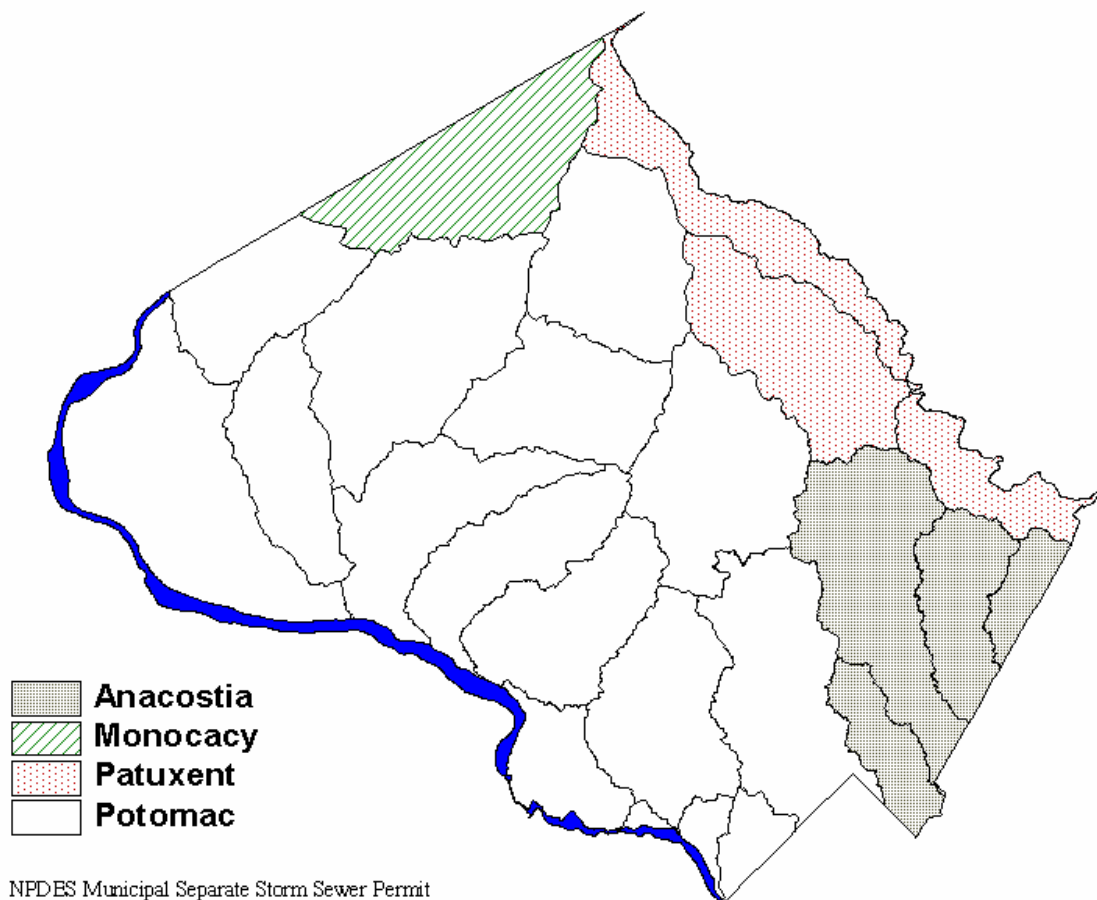
| PERMIT CONDITION | Permit Year |
|-------------------------------|--------------------|
| | 2001 |
| GP_NUM ¹ | 886 |
| PRJ_NUM ² | 231 |
| REDEV ³ | 35 |
| EXEMPT | 59 |
| QP_2 ⁴ | 52 |
| CP_V ⁵ | 0 |
| H2O_QUAL ⁶ | 31 |
| RED_WAV QP_2 ⁷ | 23 |
| RED_WAV CP_V ⁷ | 0 |
| RED_WAV H2O_QUAL ⁷ | 10 |
| FEES_NUM ⁸ | |
| FEES_TOT ⁸ | \$1,183,587 |
| ACRE_DV ⁹ | 2,125 |
| ACRE_TR ¹⁰ | 1,256 |

NOTES:

1. GP_NUM = Number of Sediment Control Permits Issued
2. PRJ_NUM = Total Number of New Preliminary Plans received, including those that are exempt or for which full or partial waivers were granted
3. REDEV = Redevelopment Projects
4. QP_2 = Number of New Projects which received full or partial waivers of 2-Year Stormwater Management Requirements
5. CP_V = Number of New Projects Which Received Waivers of Channel Protection Volume Storage Requirements
6. H2O_QUAL = Number of New Projects which received waivers of quality management requirements
7. RED_WAV = Number of Redevelopment Projects which received waivers (Based on Same Type of Waiver as for New Development)
8. FEES_TOT = Waiver Fees are required where waivers are granted and are collected when Building Permits are requested. Therefore, the Number of Fee Collections is Inconsequential.
9. ACRE_DV: Acres Developed (Based on Issued Sediment Control Permits). Includes acres not required to have additional stormwater management BMPs: Forest Harvesting Plans; large-lot subdivisions grandfathered under previous State Stormwater Design criteria; and new development to already existing regional stormwater management facilities.
10. ACRE_TR: Acres Served by Stormwater Management Facilities (Based on Approved Stormwater Facilities which are included in issued SedimentControl Permits).

The stormwater implementation information must be reported by major County watershed. Figure III-2 shows the four major County watersheds for the purposes of permit reporting. From smallest to largest by drainage area size, these are the Monocacy, the Anacostia, the Patuxent, and the Potomac. The Monocacy, the Anacostia, and the Potomac major watersheds are all contained within the State's Middle Potomac Tributary Team Basin.

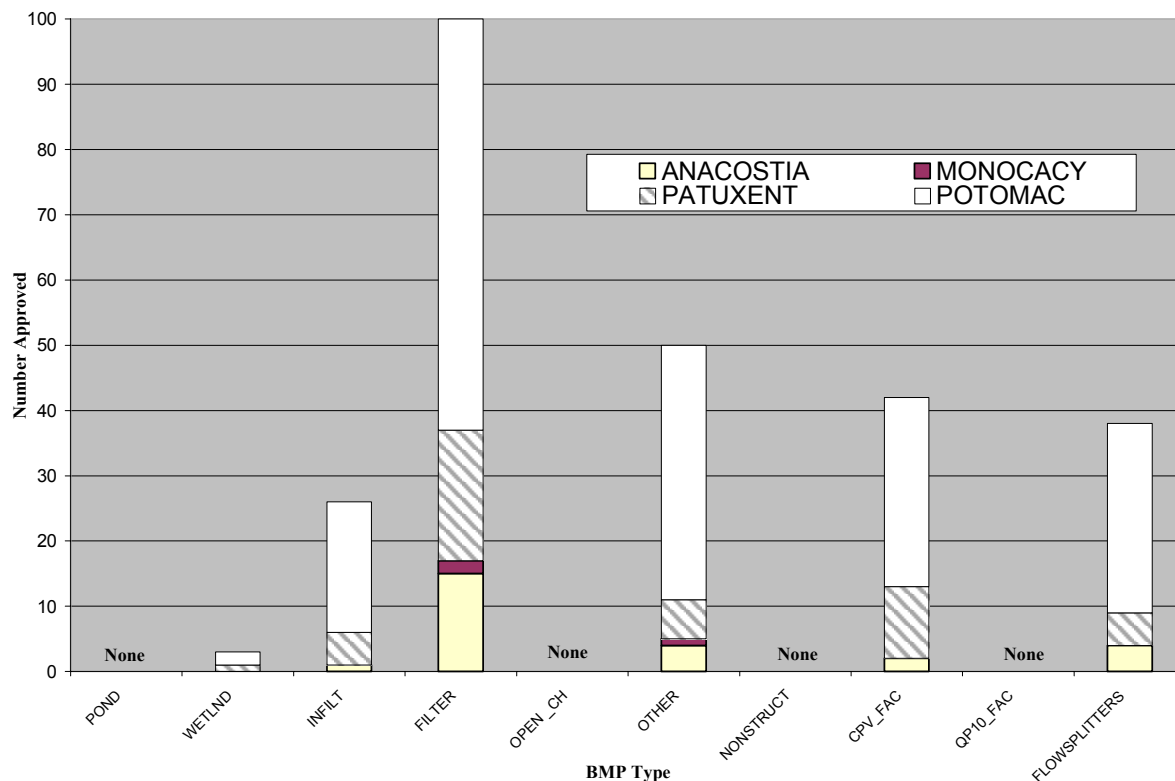
Figure III-2. Montgomery County Major Watersheds.



| Major County Watershed | Acres | Percent Developed |
|-----------------------------|----------------|-------------------|
| POTOMAC | 225,617 | 43 |
| ANACOSTIA | 38,084 | 69 |
| MONOCACY | 21,162 | 8 |
| TOTAL MIDDLE POTOMAC | 284,863 | 45 |
| PATUXENT | 38,935 | 11 |
| TOTAL COUNTY | 323,798 | 39 |

Figure III-3 compares types of BMPs approved and implemented during 2001 by County major watershed. This information is also included in the database on the CD in Attachment A. Among all watersheds, the category with the largest number approved was that of "FILTER", stormwater filters. Stormwater filters are water quality practices that capture, temporarily store, and pass the volume to be treated for water quality through a filter bed of sand, organic matter, soil, or other media. Design variants include surface, underground, and perimeter sand filters, organic filters, pocket sand filters, and bioretention systems. These are individual structures, and do not reflect treatment train relationships, i.e. where initial runoff treatment is through a sand filter which then discharges into a pond for additional treatment.

FIGURE III-3. Best Management Practice (BMP) Implementation Information by County Major Watershed



Notes:

1. For This Report CPV Means Two Year Stormwater Management
2. Some Wetlands, Infiltration Systems, and Filtration Systems Also Provide Two Year Stormwater Management
3. "Other" Facilities Typically Include Those Not Approved By MDE as Meeting Full Water Quality Requirements

E2. Illicit Discharge Detection and Elimination

Water Quality Investigations during 2001

For calendar year 2001, the DEP's Division of Environmental Policy and Compliance (DEPC) investigated 173 water quality complaints, 124 hazardous materials spills and discharges, which resulted in 8 civil citations, and 46 Notice of Violations (NOVs). Summarized in Table III-3 on the next page are some of the more significant of these investigations performed by the DEPC in 2001.

Most of the reported incidents occurred in the Potomac Watershed. The first three on this list occurred in the Anacostia Watershed. The last occurred in Olney, the most urban area of the Patuxent Watershed which is predominantly rural suburban and agricultural land uses.

Outfall screening

During 2001, the DEP screened a total of 111 outfalls in the Sligo Creek, Rock Creek, Great Seneca Creek, and Northwest Branch watersheds. These are marked as Locations D in Figure III-1. The outfall screening results are included in the database on the CD in Attachment A.

The DEP has decided to monitor outfalls in areas of the county with urban, often older, development with a relatively large impervious drainage area and a history of environmental complaints and enforcement activity. Since storm drain outfalls carry nonpoint source runoff, contaminants appear on an intermittent and usually unpredictable basis.

Of the 111 outfalls monitored, only eight had a dry weather flow and the remaining had no flow at all. Detergent was detected at five outfalls and chlorine was detected at three of the outfalls that may indicate car washing or other similar activity in the area. In fact, on one occasion, the flow was traced to a neighborhood where car washing was occurring. The other seven outfalls which had dry weather flow will have follow-up investigations to determine the possible source. Phenol and copper were detected at one outfall in Lower Rock Creek that is near a high school and then phenol was also detected at an outfall just downstream of this one.

Outfall screening provided opportunities to field verify the location of storm drain inlets and outlets indicated on the maps. Errors discovered on the maps were reported to and corrected by the DEP GIS team. Outfalls identified as needing maintenance, for example structural repairs or cleaning, were referred to the maintenance section of the DPWT for further action.

TABLE III-3. Examples of Water Quality Enforcement during 2001.

1. Rampart Way, Wheaton.

Large quantities of cooking grease had been observed at the outfall over a significant period of time and the source finally determined to be illegal cooking grease disposal from the food court at the adjacent Westfield Shoppingtown. The mall cleaning crew was collecting cooking grease from several of the food court restaurants and then dumping it directly into a storm drain inlet located next to a dumpster in the underground mall service tunnel. NOV's were issued to several restaurants. The mall hired a contractor to clean the storm drain system. System is now clean of all grease and all restaurants have cooking grease haulers under contract.

2. Kinghouse Road, Silver Spring

A resident reported a possible leaking residential underground fuel storage tank (UST) in an area where DEP has previously investigated UST incidents. It was determined that at least 4 UST's were leaking and all tanks were ordered removed by MDE and cleanup was completed. Problems may continue in this community as the houses were built about 30 years ago and all of the old tanks may not have been replaced. DEP will monitor the area for signs of further problems.

3. Brookville Road, Silver Spring MD

Concrete Jungle was illegally discharging wastewater from their concrete processing operation via a hose out the back door where it flowed across the parking lot and onto the Georgetown Trail. Concrete sediment was observed in the parking lot, on the slope and on the trail. NOV's and corrective orders were issued. A trench drain and a containment pit were installed to capture and contain the wastewater. Plans include a filter system to filter the concrete sediment and recycle the water back through the system.

4. Little Falls Branch at Somerset Park and Wisconsin Avenue, Bethesda

A white discharge was reported coming from the outfall at this location. The discharge appeared to be a cleaning product and the source was determined to be from cleaning operations from the cleaning of the underground subway tunnels. WMATA was notified and issued a memo to all contractors. The case was referred to MDE for further enforcement action because WMATA has a NPDES discharge permit issued by the state.

5. Howard Avenue, Kensington

An auto repair business was discharging wastewater from an outside car washing operation. The discharge ran down Howard Avenue and into Rock Creek. A written NOV was issued to the owner. The facility installed a trench drain and wastewater recycling system to eliminate the discharge.

6. 6100 Block Executive Blvd. Rockville

RMA Chauffeured Transportation was discharging wastewater from their washing and detailing area within the parking garage to a floor drain that was piped to an outfall and discharging to a tributary of Cabin John Creek. A NOV and Corrective Order was issued to stop the unpermitted discharge. The floor drain was blocked and all wastewater was captured and pumped into a holding tank. The wastewater was then pumped from the tank and into the sanitary sewer system.

7. Shady Grove Transfer Station, Derwood

In summer 2001, a sewage odor was reported at an outfall located at the south edge of the transfer station property next to the Materials Recycling Facility (MRF). The WSSC was called to investigate and traced the line, but no sewage leak was detected. Further investigation revealed a restaurant in the adjacent Shady Grove Plaza had a cross-connection between the restaurant's interceptor pit and the storm drain system. A plumbing contractor was hired to correct the cross-connection and redirect to the sanitary sewer.

8. 19400 Block Waters Road, Germantown

In June 2001, a search warrant was executed at this property to investigate potential water pollution violations as well as solid waste, hazardous waste and materials storage and other related charges. Investigation revealed open containers of used oil, antifreeze, solvents, paints automobile batteries and other pollutants exposed to the elements. Perhaps more importantly, years ago a drain had been installed into a sewage drain field and an unknown amount of contaminants had been dumped into the drain. By year's end, all open containers and batteries had been taken to legal disposal sites, all spills had been cleaned, all solid waste had been removed, and at least 5 underground storage tanks had been removed under MDE guidance. The owner was fined \$42,000, ordered to continue to remediate all remaining violations, and allow DEP to inspect his property through July 2004. Failure to comply will constitute criminal contempt and possible jail. Remaining issues are two underground storage tanks that must be tested and removed if leaking, minor solid waste violations, and the testing and possible remediation of the drain field.

9. 15000 Block White Ground, Boyds

In February 2001 a search warrant was executed for the property located in the 15000 Block of White Ground Road. A septic hauler was disposing of raw sewage into unpermitted underground storage tanks and discharging directly onto the ground. Additional violations included a significant accumulation of solid waste specifically, thousands of computers, over 100 vehicles, numerous batteries and general solid waste. At the end of 2001 all water violations had been removed, the underground tanks pulled and fines paid. Still outstanding are the solid waste violations which have not yet been corrected to the satisfaction of enforcement agencies.

10. Windsor Hill Drive, Olney

Complaint received of an unknown oily substance in a stormwater pond. The material was determined to be cooking grease with about 20 gallons spilled and having left an oily ring around the high water mark of the pond. The investigation focused on the adjacent Olney Town Center and cooking grease was discovered in one of the oil/grit separators on the parking lot behind a restaurant. All restaurants were issued NOV's and the property manager of the shopping center was ordered to hire a contractor to clean the separators. The grease in and around the pond was cleaned by a contractor hired by the HOA. The situation is being monitored by DEP.

Implementation Status of Stormwater Pollution Prevention Plans

During the year 2001, the DPWT hired URS-Greiner, Inc. to update the existing Stormwater Pollution Prevention Plans (SWP3s) that had been originally prepared in 1993. This action was initiated in response to an MDE inspection at the County's Poolesville Depot in March, 2001 and subsequent report of non-compliance with the requirements of the General Permit for Industrial Stormwater Discharges. One of the major non-compliance issues was the absence of a SWP3 at the Poolesville Depot and Depot staff lacking knowledge of its existence.

The updated Plans include current facility maps, on-site evaluation of structural and non-structural BMPs, and checklists for routine site inspections to track required site maintenance and housekeeping. The DPWT has committed to maintaining routine inspection logs and to conducting annual site assessments to assure compliance with the General Permit requirements and its commitments to the County's Environmental Management System approach (discussed under Public Outreach).

Table III-4 lists the County facilities covered under the General Permit for Industrial Stormwater Discharges (General Permit) and a summary of the annual site assessments completed during Spring 2002. The Annual Site Assessment Reports are included electronically on the CD in Attachment A with paper copies of the Site Maps/Plans included in Attachment B. These facilities have shown dramatic improvements in housekeeping, site appearance, and attention to materials handling and storage since the County's Pollution Prevention (P2) Coordinator conducted site visits during the year 2000. Outstanding issues include the need for greater attention to routine inspections and record-keeping, for restrictions on outdoor vehicle washing when no runoff controls are present on-site, and more widespread employee training.

An important component of the SWP3s and pollution prevention in general is that of employee awareness and involvement. To date, the DPWT has held annual two-hour training sessions on the SWP3 development and implementation for employees at facilities covered under the General Permit. Attendance has been limited to those staff most immediately affected by the SWP3s, those required to do the routine inspections and recordkeeping.

The P2 Coordinator has recommended that site-specific and more periodic training sessions be instituted to assure that a broader cross-section of all employees are made aware of the County's P2 Program and pertinent regulatory requirements. These on-site sessions would enhance employee level of awareness of the County's Environmental Management System objectives and the importance of pollution prevention to safeguard the environment and human health. During 2002, the County is investigating the most effective approaches to increase employee awareness and encourage active participation to meet these objectives.

**TABLE III-4. Results of Annual Site Assessments at Montgomery County Facilities
Under the General Permit for Stormwater Discharges (MD-97SW).**

| FACILITY | WATERSHED | ACRES | SUMMARY |
|--|--|----------------------|--|
| Colesville Depot | Anacostia-Paint Branch | 12 | In very good condition with good recordkeeping; need for attention to materials and drum storage |
| Damascus Depot | Potomac-Great Seneca Creek | 1.4 | Need to include public "drop-off" area in routine inspections; outdoor vehicle washing is occurring without runoff control |
| Equipment Management Operations Center/ Gaithersburg Highway Services | Potomac-Rock Creek | 26 | Need for more detail on routine inspections and housekeeping; outdoor vehicle washing is occurring despite indoor vehicle wash facility on-site |
| Poolesville Depot | Potomac-Dry Seneca Creek | 4 | Need for more routine inspections and attention to housekeeping; outdoor vehicle washing is occurring without runoff control |
| Seven Locks Facility | Potomac-Cabin John Creek | 19 | Need for more routine inspections and housekeeping; outdoor truck washing is occurring |
| Silver Spring/ Brookville Service Park | Potomac-Rock Creek | 18 | Need for more routine inspections and housekeeping; vacuum truck dewatering area needed; missing curbing behind scrap metal dumpster; outdoor truck washing facility needs repair; oil storage tank needs repair |
| Transfer Station/Materials Recycling Facility | Potomac-Rock Creek | 43 out of 52.5 | Extensive inspections and recordkeeping logs; minor housekeeping items to be addressed; water quality violation from adjacent commercial property was identified during annual site assessment |
| Gude Landfill (closed 1982) | Potomac-Rock Creek | 120 | Minor erosion to be addressed |
| Oaks Landfill (closed 1997) | Patuxent-Hawlings River and Potomac-Rock Creek | 190 out of 545 total | Extensive inspections and recordkeeping; minor erosion problems |

E3. Illegal Dumping and Spills

Cooking Grease Discharges

The DEP continues to support its Illegal Dumping Hotline at 240-777-7700. Through these reports during 2001, the DEP noted an increase in cooking grease discharges, particularly large quantity discharges. There seems to be a correlation between the time cooking grease haulers started to charge a fee to remove and dispose of grease and the increase in incidents. Since the DEP believes these to be a significant water quality issue, the DEP became more aggressive in 2001 in tracking cooking grease discharges. The DEP will continue to send warning letters to restaurants in the urban areas of the County and to work closely with the Health Department and WSSC in pursuing violators

E4. Sediment and Erosion Control

Implementing Program Improvements

Three issues were raised during the most recent MDE program delegation review and have been or will soon be addressed.

- *Reduce the number of expired plans.* The sediment control inspection section has identified those permits that have expired and have been actively directing project owners to renew their permits through DPS's plan review section. This procedure should be completed within a year.
- *Stabilize swales to sediment traps and basins in development sites.* The sediment control inspection section now routinely directs the site managers and project owners to stabilize swales that lead to sediment traps and basin.
- *Prepare inspection reports after a field inspection.* The sediment control inspection staff is now routinely preparing inspection reports after an inspection has been completed.

Responsible Personnel Certification

The list of attendees and related information for the years 2000 and 2001 Responsible Personnel Certification classes were submitted to MDE on March 12, 2002. The year 2001 information is included in the database on the CD in Attachment A.

Grading Permits for Projects Greater Than One Acre

The County permit requires quarterly reporting on information regarding land disturbing activities exceeding one acre or more. The information is being submitted electronically to MDE, with the quarter ending March 31, 2001 included on the CD in Attachment A. Current needs include modifying data fields in the County's permit database to capture all of the Permit-required information. This should be done by January 1, 2003.

E5. Public Education and Outreach

The DEP continues to be the lead County agency for providing its residents, business owners, and resources users with timely information on current environmental issues. Examples follow which show how public outreach and education opportunities are routinely integrated into monitoring, assessments, detection and enforcement, and other Permit programmatic requirements.

A wide variety of fact sheets, interest articles, and links to federal, state, and non-profit group web sites are available on the DEP web site (askdep.com). The number of "web site hits", i.e. people checking in, has increased tremendously over the past several years and has indicated significant attention from around the world, as shown in Figure III-4.

The screenshot displays the homepage of the askDEP.com website. At the top center, it says "Welcome to... askDEP.com" with a question mark icon. Below this, a navigation instruction reads: "Navigate this site by clicking on one of our key program areas, to the right, or visiting our Index/Site Map for individual listings on hundreds of topics." The central focus is an "OZONE ACTION ALERT" banner for "Air Quality Forecast" with a "Code Red" status indicating "Unhealthy" conditions. To the left, a "Special Topics" sidebar lists: "What's New?", "Mosquitoes", "Ground-Level Ozone", and "Grasscycling", each with a corresponding illustration. To the right, a "Programs" sidebar lists various environmental services: Air Quality, Biological Monitoring, Brownfields, Climate Protection, Composting, Drought, Education, Employment & Internships, Energy Programs, Energy Deregulation, Enforcement, Environmental Assessment, Environmental Health, Environmental Partners, Grasscycling, Green Man, Groundwater, Invasive Plants, Lawns & Landscaping, Light Pollution, Natural Landscaping, Noise Control, Pesticides & IPM, Pollution Prevention, Radon, Rainscapes, Recycling & Solid Waste, and Resource Conservation. At the bottom, a "Drought Emergency" section explains that certain areas of Montgomery County are not served by WSSC or the City of Rockville, accompanied by an illustration of a person watering a plant.

Special Topics

What's New?

Mosquitoes

Ground-Level Ozone

Grasscycling

Welcome to...
askDEP.com

Navigate this site by clicking on one of our key program areas, to the right, or visiting our **Index/Site Map** for individual listings on hundreds of topics.

OZONE ACTION ALERT

Air Quality Forecast
Code Red
Unhealthy

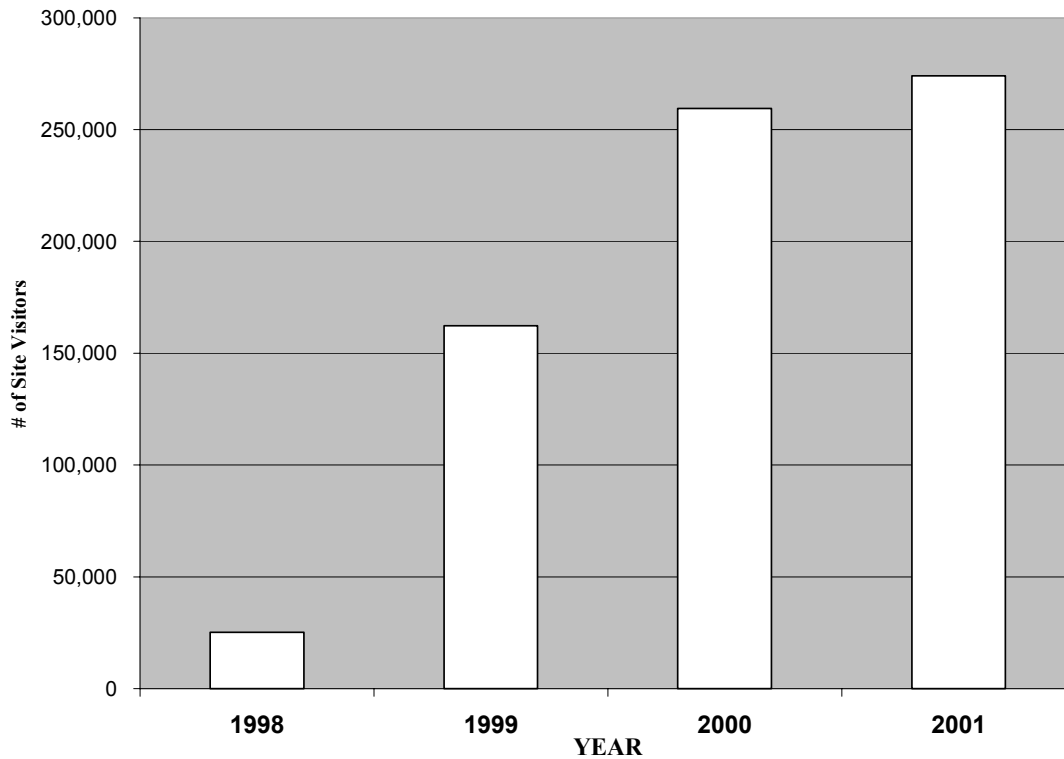
Visit our **Ground-Level Ozone Page** for more detailed information on our area's air quality, including real-time ozone level reports, action plans, and advice on reducing exposure to the effects of ground-level ozone.

Drought Emergency
The areas of Montgomery County included in the **Drought Emergency** are those areas that are NOT served by WSSC or the City of Rockville.
The areas included in the Drought

Programs

Air Quality
Biological Monitoring
Brownfields
Climate Protection
Composting
Drought
Education
Employment & Internships
Energy Programs
Energy Deregulation
Enforcement
Environmental Assessment
Environmental Health
Environmental Partners
Grasscycling
Green Man
Groundwater
Invasive Plants
Lawns & Landscaping
Light Pollution
Natural Landscaping
Noise Control
Pesticides & IPM
Pollution Prevention
Radon
Rainscapes
Recycling & Solid Waste
Resource Conservation

FIGURE III-4. Visitors to the DEP Website from 1998-2001.



| | | | | | |
|-------------|-----------|-------------|--------------|--------------|-------------|
| Argentina | Estonia | Israel | New Zealand | Slovenia | Tobago |
| Australia | Fiji | Italy | Norway | South Africa | United Arab |
| Austria | Finland | Japan | Peru | South | Emirates |
| Belgium | France | Latvia | Poland | Korea | United |
| Brazil | Germany | Lebanon | Portugal | Spain | Kingdom |
| Bulgaria | Greece | Lesotho | Russian | Sri Lanka | Uruguay |
| Canada | Guam | Lithuania | Federation | Sweden | Venezuela |
| China | Guatemala | Macedonia | Saudi Arabia | Switzerland | |
| Colombia | Hong Kong | Malaysia | Singapore | Taiwan | |
| Denmark | India | Mauritius | Slovak | Thailand | |
| El Salvador | Indonesia | Mexico | Republic | Trinidad & | |
| | Ireland | Netherlands | | | |

Watershed Outreach

The DEP's Watershed Management Division (WMD) continues public outreach related to stream habitat and water quality and stream restoration projects. As in past years, the WMD led the Aquatics Section for the Annual Envirothon for High School Students and worked with the DEPC in preparing and presenting the year 2001 special session on Urban Nonpoint Source Pollution issues.

To provide watershed study results for the public, the WMD developed a summary document format to use for the resulting Action Plan for implementation. The first use occurred for the Rock Creek Watershed Restoration Study which was completed in July 2001. The accompanying Action Plan summary document is included in electronic format on the CD in Attachment A and in paper copy in Attachment C. It includes watershed background, stormwater retrofit and stream restoration project identification, information on pollution prevention at home, and references for additional information. Future Watershed Restoration Studies will use a similar format for public outreach purposes.

The WMD recognizes that public support is crucial to the successful implementation of selected projects and routinely holds public meetings for ongoing studies and proposed projects. The project managers have even organized Saturday Stream Walks at certain projects to allow the public to see first hand the extent of existing problems and possible remediation. During 2001, these all occurred in the Potomac River watershed.

- Public Meetings for Watershed Restoration Opportunities
 - Little Falls II Project (6/20/01), 35 people attended
 - Upper Rock Creek Stream Valley Drive (11/29/01), 15 people attended
- Saturday Stream Walks for ongoing watershed restoration projects in Rock Creek
 - Sycamore Creek (8/18/01), 25 people
 - Turkey Branch (8/25/01), 15 people
 - Joseph's Branch (10/8/01), 10 people
 - Joseph's Branch, Spruell Drive Tributary (11/17/01), 20 people



Outreach to the Business Community

Clean Water Partners Program

The Clean Water Partners program is entering its sixth year as an ongoing and valuable program for educating the public and business about water quality concerns. Clean Water Partners assist with stream cleanups and monitoring and will be asked to participate in the Environmental Partners Program that combines all environmental disciplines into one comprehensive program. As of Spring 2002, 56 County businesses were "Clean Water Partners".

Environmental Partners Program

In an attempt to stem the tide of rising water quality complaints, the DEPC embarked on an outreach program designed to target specific businesses that may contribute to these problems. The "Environmental Partners" program was launched in June 2001 as an enhancement to the successful "Clean Water Partners" program. Environmental Partners attempted to take the highlights of the Clean Waters Program which focuses on water quality and expand it to include all environmental disciplines.

The program began with a focus on educating small automobile repair shops in proper storage and disposal methods as well as about the latest technology and advances in pollution prevention. The resulting Manual includes Vehicle Maintenance and Repair Fact Sheets, which focus on proper storage, labeling, spill cleanup, proper floor and vehicle washing, facts on "Generator Status", and disposal methods for waste products, oil recycling, used shop towels and absorbents, used filters, antifreeze recycling, battery recycling, and tire recycling. Some of the Fact Sheets include "lessons learned and product substitution tested", such as a Solvent Cleaner Fact Sheet that discusses pollution prevention alternatives which eliminate regulatory requirements, reduce or eliminate waste streams, reduce operational costs, and reduce the risk and liability associated with their waste generation.

In what amounted to a "shake down" cruise, the DEPC inspected 42 repair shops and enlisted six environmental partners. The first six months of the program were viewed as a learning process for DEPC staff. This program has proved successful and efforts will increase in 2002 to add partners.

This program involves a comprehensive inspection program with the goal of educating business about pollution prevention and saving money using environmentally friendly products. While the emphasis is on voluntary compliance there is an enforcement component. In order to become a partner the business MUST be in compliance with all Federal, State and Local laws, and must have all applicable permits. Additionally each business must agree to adopt (if they have not already done so) at least one environmental alternative in air quality, water quality, product substitution, and solid waste disposal. Affected outfalls are monitored before, during and after the business's entry into the program. Reductions in air emissions, water discharges and hazardous waste generated are monitored as well. Qualified businesses will receive free advertising both in print and on the DEP web site, and will receive a plaque of recognition to display at their site.

County's Pollution Prevention Program

During 2001, the County has met the P2 training and awareness objective by providing monthly meetings to staff from County agencies, the Cities of Gaithersburg and Rockville, the Washington Suburban Sanitary Commission, and the Maryland-National Capitol Park and Planning Commission. These meetings have become a forum for employee to employee communication and discussion of opportunities for improvements. Meeting topics during 2001 included:

1. Vehicle and Equipment Maintenance

Distribution of DEP fact sheets and discussion on environmental laws and regulations and P2 opportunities in vehicle and equipment maintenance.

2. Habitat Stewardship: Guest Speaker - Bob Johnson, Executive VP, Wildlife Habitat Council (WHC). Overview of the WHC's achievements and review of MOU signed between DEP and WHC, April 6, 1999 for potential use at Montgomery County facilities to serve as models to spur involvement of other land owners.

3. Bayscaping: Guest speaker - Larry Coffman, Prince Georges County Department of Environmental Resources. Tour and overview of Low Impact Development (LID) techniques for managing stormwater runoff. Introduction to Bayscaping as an LID technique to achieve runoff volume and pollutant reduction at County-owned sites.

4. The 2002 Mid-Atlantic Premier Pollution Prevention Conference. Sponsored by the National Pollution Prevention Roundtable. The DEP P2 Coordinator helped coordinate and promote this regional conference which provided the latest P2 information and case studies on environmental management systems for local governments. There were speakers from federal, state, and local agencies, and consultants on compliance, waste minimization, environmentally preferred

purchasing, Hazardous Waste and Clean Water Act regulations and requirements.

5. Tour of the Recycling Center Facility: Guest Speaker - Jeff Marks-DPWT/Division of Facility Services. Tour of the County's facility including path of recyclables from the collection point (home, business etc) to the recycling center (sorting of material), then the recycling materials processor ,and finally the remanufacturer of a recycled product.

6. Rain barrels: Guest speaker - Wayne Nebel DPWT/Engineering Services. His experiences with "rain barrels", how he learned about them and how they work.

7. Mercury Thermometer Exchange: Guest Speaker - Rick Dimont, DPWT/Solid Waste. Introduction of County's new "Trade it in" program whereby residents can bring their own mercury thermometer to a Household Hazardous Waste collection and receive a free digital fever thermometer.

8. Integrated Pest Management (IPM): Guest Speaker - Jeff Marks-DPWT/DFS. Overview of the history of the County's program, what Integrated Pest Management (IPM) is, why/how DFS came to adopt it, and the benefits of using IPM versus conventional pest control methods. Also discussed how DFS can assist other County agencies on how to use IPM approach.

Environmental Management Systems (EMS)

In late Spring 2001, Montgomery County augmented its P2 program by committing five departments (Recreation, Health and Human Services, Fire and Rescue, DPWT, and DEP) in a pilot study which involved training to develop and implement EMSs in these departments. An EMS is “a formal set of policies and procedures that define how an organization will manage its potential impacts on the natural environment and on the health and welfare of the people”. Since 1996, the most commonly used type of EMS has been the one developed by the International Organization for Standardization, the ISO 14001 Environmental Management Standard. This is the framework used in Montgomery County, with the aid of a consultant implemented in its pilot study.

The three key elements of an EMS are: pollution prevention, environmental compliance, and continual improvement. Going through the EMS development process has improved relationships of these departments with environmental regulators and awareness of pollution prevention. An outcome of the EMS pilot study has been the expanded awareness of P2 in these departments and their implementation of P2 techniques such as product substitutions and operation modifications. One of the most important aspects of an EMS is evaluating effects across all environmental media-- air, surface water, and groundwater-- and understanding how improvements in one (e.g. reduced air emissions) can produce improvements for another (reduced acid rain).

The DPWT has established its EMS objectives and targets and management plans to achieve their EMS and is making reasonable progress in their achievement. The resulting management plans include programs related specifically to stormwater pollution prevention and compliance with NPDES (both Industrial General and Municipal) stormwater permit requirements.

The DEP has made significant progress in achieving its EMS management plans to achieve its objectives and targets. All of DEP's EMS management programs relate to pollution prevention. One example includes the adoption of contract standards to minimize land disturbance and possible sediment runoff during restoration or retrofit project construction. Another of the DEP's EMS tangible products has been the adoption of a life-cycle approach to vehicle fleet selection which resulted in the purchase of two Hybrid Electric Vehicle (HEVs). These HEVs produce significantly less polluting air emissions than traditional vehicles.

The Fire and Rescue Service (F&R) has had the same small core of four participants from the beginning of the EMS Workshops. The F&R EMS Team has established objectives and targets and management plans to achieve them and was making reasonable progress in their achievement. All four of F&R's EMS management plans include P2-related programs. They range from evaluating their stations for the feasibility for “bayscaping” (construction of Low Impact Design, or LID, rain gardens) to control stormwater runoff, reducing energy consumption by changing employee behavior, establishing specific policies for each station regarding energy conservation and measuring and monitoring indoor air quality at all fire stations; and, developing a "low environmental impact" vehicle maintenance and repair manual specific to fire and rescue equipment.

The Departments of Recreation and Health and Human Services (HHS) are also making progress. The HHS conducted an exchange program of mercury thermometers used at one of their clinics for digital fever thermometers, eliminating the possibility of mercury pollution by thermometer breakage.

E6. Road Maintenance and Pollution Prevention

Cleaning inlets

The DPWT Division of Highway Services (DHS) retains responsibility for cleaning clogged storm drains and inlets. The current program is largely driven by citizen complaints and the amount of material removed is not tracked. Using this approach, it is not possible to assess the actual percentage of the County's storm drain system that needs to be maintained on a routine basis. As shown in Table III-5, the linear feet of storm drains cleaned per year is significantly less than 1% of the total feet of County storm drains.

TABLE III-5. Length of County Storm Drains Cleaned by Year (1996-2001).

| YEAR: | 2001 | 2000 | 1999 | 1998 | 1997 | 1996 |
|----------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| linear feet storm drains cleaned | 17,500 | 13,700 | 13,650 | 10,700 | 10,400 | 10,400 |
| total feet storm drain | 3,800,000 | 3,800,000 | 3,800,000 | 3,800,000 | 3,800,000 | 3,800,000 |
| % storm drains cleaned | 0.460 | 0.360 | 0.359 | 0.282 | 0.274 | 0.274 |

Status of Storm Drain System

During 2001, a small subset of the County's storm drain systems were inspected using a video-camera to evaluate the extent of existing maintenance needs. Inspection results were entered into an ACCESS database, but it became evident during the study that a more complex application would be needed to provide for ready data analysis on larger datasets.

The resultant consultant report (CH2M Hill, 2001) found that in general, the inspected storm drains were in good condition. No segments were rated Condition Category 1, which is a segment that has failed and needs immediate repairs. A relatively small number of segments were rated Condition Category 2, which is a segment that is operational, but needs immediate repairs to continue to be operational. Most segments were rated Condition Category 4, which indicated the segment is structurally sound and repairs are not expected for at least 5 years.

The most common defects identified were longitudinal and multiple fractures and broken joints. In most cases, these defects were of a limited extent and internal spot repairs were the recommended rehabilitation method. However, there were numerous instances of debris and sediment accumulation identified for which cleaning was recommended.

The consultant prepared an estimate for total system rehabilitation and/or replacement of \$874 million, or \$12 million per year over an assumed 75-year service life. The assumptions behind this estimate were:

- Total system length = 3.8 million feet
- Average diameter = 24 inches
- Average useful life = 75 years
- 10% of total length will need to be replaced in a 75 year period
- 90% of total length can be rehabilitated to extend useful life
- Average rehabilitation cost = \$200/ft
- Average replacement cost = \$500/ft
- Total capital needs = \$874 million total or \$12 million/year over 75 year service life

The storm drain inspections conducted for this project provided only a small sampling of the condition of the overall Montgomery County storm drain system. The consultant recommended that 5 percent of the system (190,000 feet) be inspected to provide a statistically significant sample which could be used to better extrapolate system-wide rehabilitation needs. Based upon the 2001 inspection and evaluation costs, the cost of inspection and data evaluation for 190,000 feet of pipe was estimated to be \$800,000. There are provisions for the Water Quality Protection Charge (discussed in Section III-G.) which could allow charge increases to fund the storm drain maintenance program, but the timetable for such an increase has not yet been determined.

Roadway Maintenance and Pollution Prevention

There are no plans to change current DPWT programs for road de-icing or roadside vegetation control. The DPWT continues to comply with all industry standards relative to the application rates of salt and abrasives during road de-icing operations. The County's product materials meet all specified requirements as set forth by State material specification. For roadside maintenance, the DPWT uses Rodeo herbicide near and around streams or where there is an immediate potential for the herbicide to enter a stream. Rodeo is registered by the EPA for use around streams as less toxic to aquatic life than other commonly used herbicides.

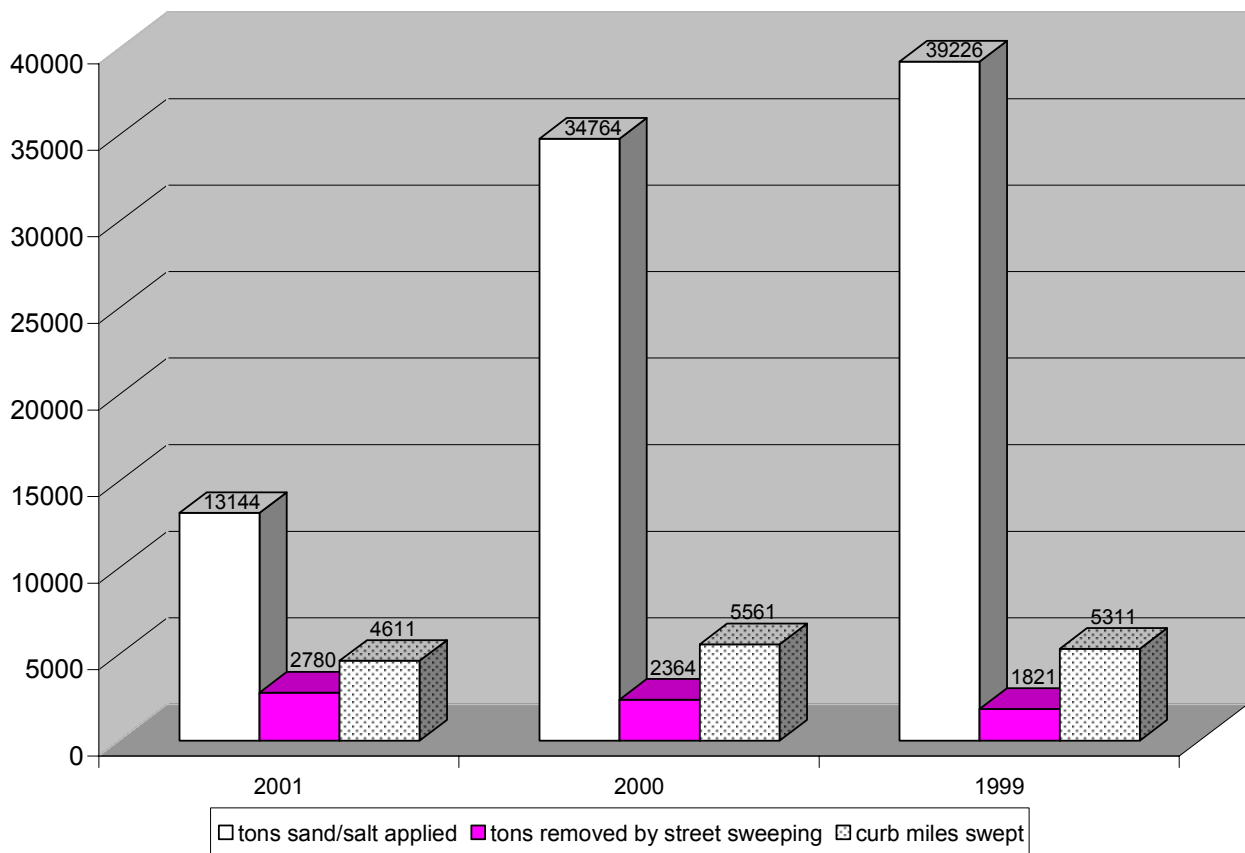
The DPWT is continuing to actively pursue ways to switch from using toxic and hazardous chemicals to less polluting alternatives in other venues. During the past year, this included the addition of a new Special Provision Insert (SPI) to all new CIP contracts (Division of Engineering Services, Construction Section.). This prohibits the use of diesel fuel for cleaning and maintaining paving equipment, trucks and hand tools. The SPI states that only a qualified asphalt release agents (as identified by the Maryland Department of Transportation, State Highway Administration, "Standard Specifications for Construction Materials") will be accepted for this use. Using these qualified asphalt release agents will reduce contamination of roadway (right-of-way) soils and storm drain systems, and eliminate clean-up and disposal of the used diesel fuel, a hazardous chemical.

Street Sweeping

During the 1996-2001 Permit period, the County was required to report on the status of its street sweeping program as a Permit requirement. The County's streetsweeping program has been primarily implemented as a means to clean up any remaining salt, sand, and grit applied during the winter months and to keep County roads free of debris and trash throughout the year.

As shown in Figure III-5, the County's street sweeping program removed a fairly consistent amount from 1999 to 2001 (from 1,821 to 2,780 tons of materials), although the tons of sand and salt applied varied greatly (from 39,226 tons in 1999 to only 13,144 tons in 2001.) The much lower amount applied in 2001 reflects an exceedingly mild winter and lack of major or numerous snow or ice events. The number of curb miles is greater than the estimated 2,176 miles of County roads because arterial roads and those in the Piney Branch Central Business District are swept more than once during the year.

FIGURE III-5. Material Applied for De-icing Activities and Removed through Streetsweeping from 1999 through 2001.



In mid-2001, the DEP learned that the DPWT funding for streetsweeping had been eliminated from its FY'02 budget. One of the DEP EMS targets became to encourage a decision to continue funding for street sweeping by doing a cost-effectiveness analysis of the value of street sweeping. This was accomplished in a report which:

- documented the current status of street sweeping in Montgomery County;
- evaluated pollutant removal from street sweeping based on a literature review; and
- made recommendations for the continuation of the County's street sweeping program to maximize pollutant removal at the lowest possible cost.

The resulting report is included in electronic format on the CD in Attachment A. Based on information supplied by DPWT and the Bethesda Urban Partnership, these two combined programs prevented about 2,500 tons of solids from washing into the County's storm drains, stormwater management facilities, and local waterways. Using literature values, an estimated 441 pounds of copper, 584 pounds of lead, and 2,954 pounds of zinc was removed in this solid material and kept from polluting County waterways. Even though the primary purpose of the street sweeping program had been to maintain neat roadways, it obviously needed to be routinely continued as a best management practice to reduce pollutants.

The resulting report and recommendations were favorably reviewed by the Office of Management and Budget who subsequently approved the adoption of streetsweeping as one of the County's Environmental Performance Indicators. These Indicators are tracked annually to measure the County's progress in environmental improvement. The year 2003 will be the first year in which streetsweeping appears in the Annual Evaluation on Environmental Performance. However, no money has been included in the FY'03 DPWT budget for streetsweeping so that funds from other sources or as a supplemental budget item will need to be used to meet this Performance Indicator.

E7. Integrated Pest Management

The Permit requires that the County evaluate and reduce its use of herbicides, pesticides, and fertilizers and submit a report describing the present application activities and proposed reduction strategies. Since February 12, 1990, Montgomery County Government agencies were required to adopt an Integrated Pest Management (IPM) program for its own employees and Contractors working in County Buildings or on County owned property. The DPWT's Division of Facility Services (DFS) is the lead agency for implementing this program. The Pest Management Policy and the April 2002 Pest Control and Pesticide Usage Guidelines are included in Attachment D.

From early on, the DFS-IPM program has been looked upon as a role model by other municipalities and local government agencies. The DFS program uses a combination of sanitation, monitoring, and habitat modification along with the judicious use of low-risk pesticides only when necessary. This approach minimizes the risk to both humans and the environment. Jeff Marks, the DFS program manager, has overseen the program since its inception and has been proactive in working with the Council's Health Advisory Committee. He has also appeared on Cable Channel 21 to publicize the wide-ranging positive benefits of practicing IPM.

When the program first began, about 250 county-owned facilities were under conventional pest control with spraying at routine intervals. Effective 1996, scheduled spraying was curtailed and a DPWT policy was put into effect where pesticides became restricted and could only be used as a last resort, and selected based on least toxicity to humans and non-target species. The facilities became subject to case by case evaluation and the development of site-specific pest control plans which involved time of use of the facility, previous pest reports, and routine facility inspections, rather than routine facility spraying. Contractors are required to carefully track the type and amount of any pesticides and/or herbicides used on County property.

In July 1997, a comprehensive five-year contract for structural Integrated Pest Management (IPM) was put into place. Between the period March 1997 - November 1997, DFS facility managers and inspection staff received three days of training in the methods of IPM and pesticide reduction. Bill Currie, Director of the "Institute of Pest Management" and other individuals provided the IPM training. Informal training of building occupants continues to take place by the DFS managers who oversee the IPM program.

For the year 2001, the DPS IPM landscape program included 170 acres at 70 facilities and the Structural IPM program covered 930,000 square feet at 63 facilities. This was the first year that DFS had included an IPM program for grounds landscaping as well as facility pests. The contract language used to establish this part of the DFS IPM Program is shown as "Attachment B" within Attachment D to this report. Funding reductions and the drought interfered with routine groundskeeping, so that pesticide and fertilizer applications were atypical during this first year. The Pesticide Usage for Calendar Year 2001 is included in Attachment D.

Currently, there are 307 facilities maintained by DFS. The 63 facilities under the Structural IPM contract mentioned above are inspected on a regular cycle for pest problems--mostly the high occupancy sites with child-care or food-service facilities. About 215 total are under contract for pest control. The others are inspected periodically by in-house staff, every six months or so.

Steps are now being initiated so that the DFS IPM program can be expanded to non-County owned facilities, such as that occupied by the DEP, as well as better coordinated with similar programs being implemented by the M-NCPPC and the Board of Education.

F. Watershed Restoration

The County is continuing its systematic assessment of water quality, stream resource conditions, and habitat modification within all of its watersheds. The County program integrates biological monitoring and physical habitat assessments with stormwater retrofit and stream restoration opportunities and public outreach and involvement. This approach leads to project construction and pollution prevention efforts that are watershed-based and that will provide water quality benefits to the maximum extent practicable.

The previous Permit required that watershed assessments be completed in all of the County's urban watersheds, including Little Falls, Sligo Creek, Rock Creek, Paint Branch, Little Paint Branch, Northwest Branch, Cabin John Creek, and Watts Branch. The Watts Branch Watershed Restoration Study was delayed from its original permit schedule due to budget and logistic constraints.

Consultant selection occurred in August 2001 and the notice to proceed was issued in March 2002, so that this restoration study is now ongoing.

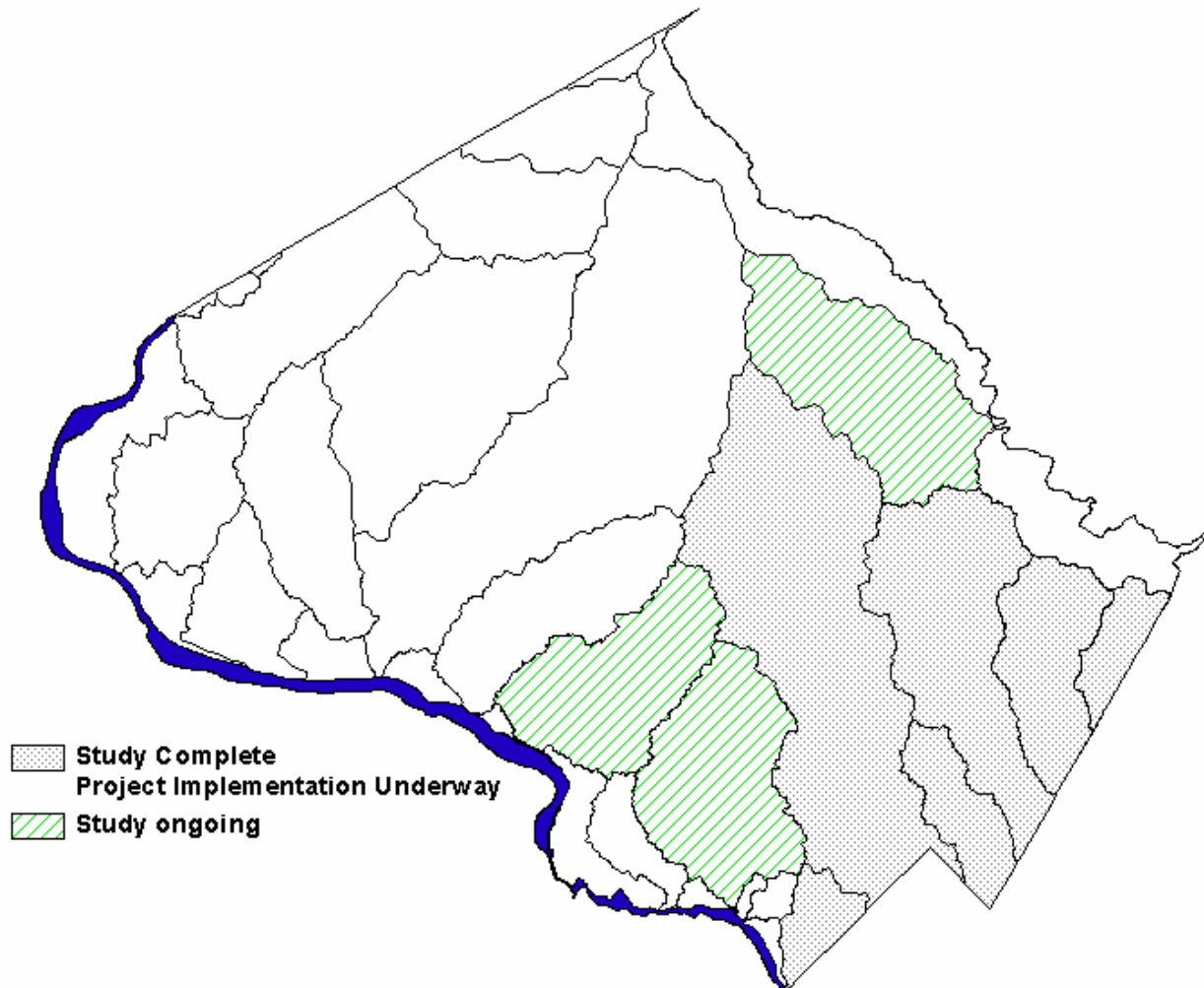
Figure III-6. shows the extent of coverage of County watersheds under restoration study or in project implementation. About 40% of the County's total acreage, and the majority of its developed areas, have been covered during the first five-year Permit period.

Table III-6 summarizes the status of the DEP's significant watershed restoration efforts through 2001. Total cost to date (including State and Federal cost-share funding) for watershed restoration efforts completed or underway has been \$21.17 million dollars. This includes 26 stormwater retrofit projects covering 4,444 acres and 51 restoration projects on 29.15 miles of impaired streams.

TABLE III-6. *Montgomery County Watershed Restoration Studies and Projects.*
(1996-2001). * Estimated costs for those projects still under design.

| Project Type | Completed or under construction | Underway or In design | Cost * (\$m) |
|---------------------|--|---|---------------------|
| Watershed Study | Upper Paint Branch; Northwest Branch; Rock Creek (191.5 sq. miles) | Cabin John Creek; Hawlings River (53 sq. miles) | 2.635 |
| Stormwater Retrofit | 622 acres (8 projects) | 3822 acres (18 projects) | 7.970 |
| Stream Restoration | 6.15 miles (11 projects) | 23 miles (40 projects) | 10.566 |

***FIGURE III-6. Montgomery County Watershed Restoration
Studies and Projects. 1996-2001.***



F1. Water Quality by Watershed

The previous permit required the County to conduct baseflow and reference stream monitoring throughout the County. This habitat, physical, and biological monitoring on a watershed basis was to serve as a countywide screening tool to identify water quality impairments. Table III-7. provides a summary of the results from this monitoring from 1995 through 2000. The majority of impaired reaches (47% of monitored stations) showed flow-related habitat impacts, which included uncontrolled stormflow volume, baseflow reduction, and sediment deposition. About 14% showed impairment which could not be attributed to physical habitat factors and which required additional follow up activities to identify and address the impairment sources.

The follow-up activities are ongoing, except in Broad Run. This watershed is in mainly agricultural land uses. Water quality impairments that result from agricultural practices must be coordinated through the Montgomery Soil Conservation District and the MDE. The success of the implemented follow-up will show up in the results from the next round of Countywide monitoring, based on any observed changes in the percentage of monitored reaches which show impairment by other than physical habitat factors.

To date, only the Seneca Creek Watershed has been monitored a second time through the County's five-year watershed monitoring cycle. This second round of monitoring was conducted during 2001, repeated three years after the baseline round rather than the originally anticipated five years. This was because in the year 2000, the DEP revised its baseline monitoring cycle to correspond with that of the Maryland DNR Biological Stream Survey (MBSS). This was done to enable a collaborative and efficient joint local/state approach to monitoring County streams. The detailed results of the 2001 monitoring are included as an electronic file on the CD in Attachment A.

Stations were selected based on a probability design where segments are randomly selected within stream order category to assure sampling that is representative of the entire watershed. Of the 65 monitored stations, seventeen showed biological impairment originally attributed to "other than habitat stressors". Figure III-7 shows the locations of these 17 stations. The 12-digit numbers correspond to the Maryland Watershed Code for ease of use in the statewide assessment of stream biological conditions. Additional review of the data indicated that the majority of these stations were impaired from excessive amounts of fine and coarse sediment as opposed to other types of pollutants.

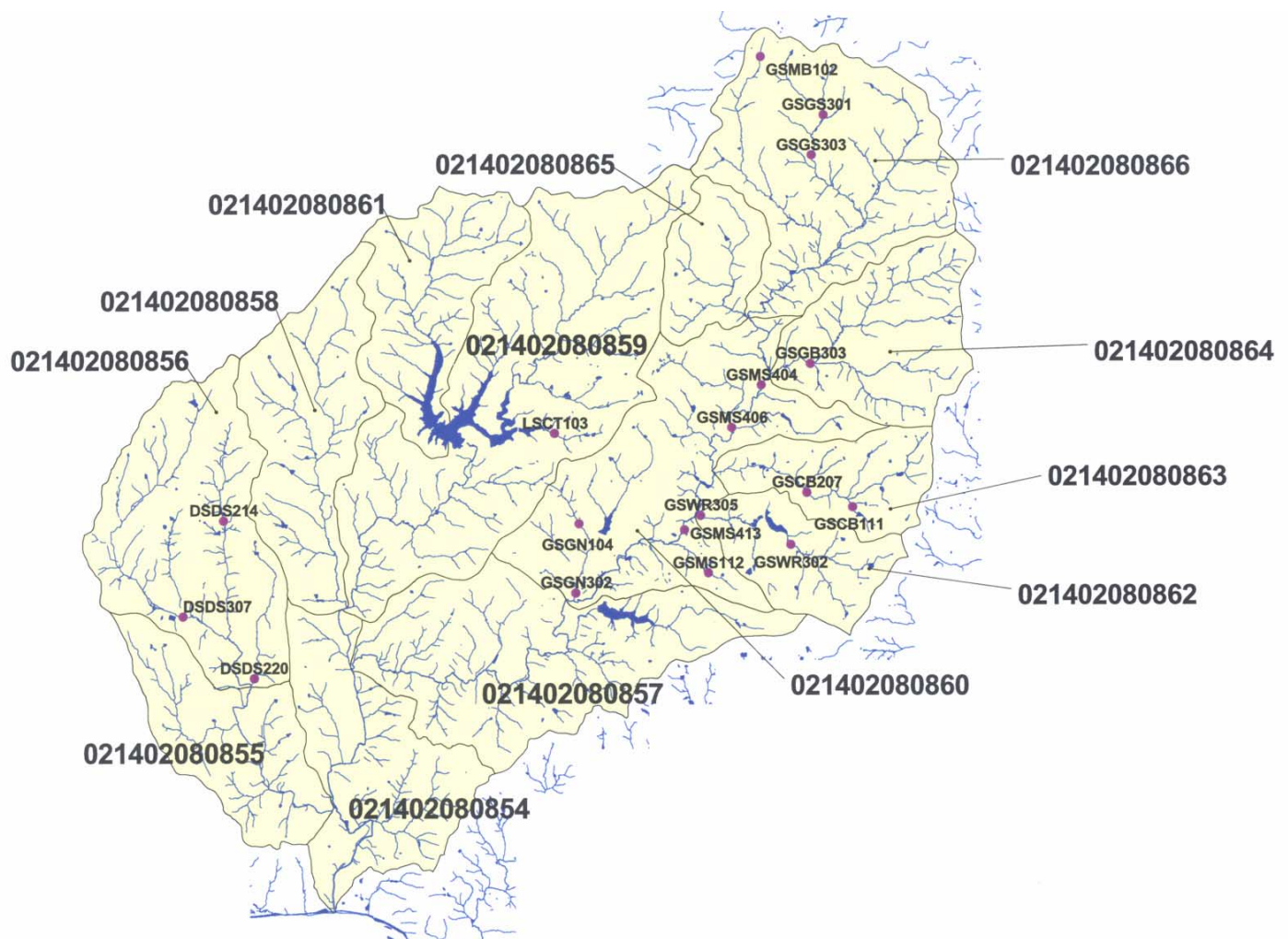
For the majority (14 of 17) of the impaired stations, the recommended follow-up was to identify these as priority reaches for restoration and bank stabilization for consideration when the Seneca Creek Watershed Restoration Study is initiated. Given the size and complexity of the watershed, restoration efforts will be undertaken for subwatersheds (e.g. Great Seneca vs Dry Seneca vs Little Seneca) rather than the entire Seneca Creek Watershed. Currently, funding is programmed for FY04-06 to conduct a Watershed Restoration Study in the Great Seneca Creek portion of the Seneca Watershed. For impaired stations within the City of Gaithersburg, the DEP has transmitted these results to appropriate City staff to begin discussions on remediation strategies. The DEP anticipates that the City will need to address these cross-boundary issues as part of the Phase 2 stormwater permit requirements for small municipalities.

TABLE III-7. Impairment by Type From Countywide Monitoring 1995-2001.

| Watershed | Year monitored | # stations | # stations with flow impairment | # impaired by other than flow | Follow up needed to identify impairment source |
|---------------------|-----------------------|-------------------|--|--------------------------------------|--|
| Seneca Creek | 1998 2001 | 52 65 | 37 0 | 12 17* *14 from sediment | Targeted outfall screening; special monitoring study below wastewater treatment plant; coordination with City of Gaithersburg through Phase 2 General Permit; priority reaches for Watershed Restoration Study |
| Upper Patuxent | 2000 | 14 | 0 | 0 | no follow up necessary |
| Broad Run | 2000 | 7 | 3 | 1 | <i>water chemistry monitoring, develop an agricultural management plan, and additional field assessments.</i> |
| Bennett Creek | 1999 | 8 | 2 | 0 | no follow up necessary |
| Little Bennett | 1999 | 16 | 5 | 0 | |
| Little Seneca | 1999 | 37 | 20 | 0 | |
| Hawlings River | 1997 | 16 | 3 | 3 | Watershed Restoration Study ongoing |
| Muddy Branch | 1997 | 15 | 12 | 1 | Follow up field investigation |
| Cabin John Creek | 1996 | 7 | 5 | 2 | Watershed Restoration Study ongoing |
| Little Paint Branch | 1996 | 8 | 6 | 0 | no follow up necessary |
| Watts Branch | 1996 | 14 | 6 | 5 | Watershed Restoration Study ongoing and coordination with City of Rockville through Phase 2 Permitting |
| Northwest Branch | 1995/1996 | 21 | 6 | 4 | Additional outfall screening and water quality complaint follow up |
| Paint Branch | 1995/1996 | 17 | 5 | 3 | |
| Rock Creek | 1995/1996 | 27 | 12 | 5 | Targeted outfall screening and coordination with City of Rockville through Phase 2 General Permit |
| TOTAL | 1995-2000 | 259 | 122 | 36 | 47% with flow impairment; 14% with other than flow impairment |

Another area with a notable concentration of impaired stations occurred in the Dry Seneca Watershed (the west side of the Seneca Creek Watershed). Station DSDS307 is located 100 meters below the Poolesville Wastewater Treatment Plant (WWTP) outfall and was rated “poor” in both 2000 and 2001, indicating continuing impairment. Habitat condition was not a source of impairment, leaving water quality stressors as likely causes. Existing point sources above DSDS307 include sewer lines and the Poolesville WWTP outfall. Nonpoint sources include surface runoff from lawns, parking lots, and agricultural fields. The same nonpoint sources exist between the two stations upstream of DSDS307, but the benthic community remained in the “excellent” to “good” range at those stations upstream of the WWTP outfall. Likely causes of the impairment noted at DSDS307 are from the WWTP point source discharge. Further investigation is being coordinated with the MDE.

FIGURE III-7. Location of Impaired Stations Within the Seneca Watershed based on 2001 Stream Monitoring Data. Also shown are Maryland 12-digit watersheds.



Seneca Wastewater Treatment Plant Monitoring

The DEP monitoring approach focuses on using stream resource conditions to identify cumulative impacts from water quality impairments. This approach has been used to evaluate potential point source impairment.

In 1994, the Seneca WWTP Citizen's Advisory Committee (CAC) expressed concerns that planned increases in treated discharge volume would adversely affect the receiving stream system. The DEP presented a proposal to the Washington Suburban Sanitary Commission (WSSC) to conduct biological and physical habitat stream monitoring in the vicinity of the Seneca WWTP outfall to assess cumulative biological impacts of pollution and to assess potential flow volume and quality impacts on stream habitat. Biological and physical condition indicators were collected at sites above and below the WWTP outfall, compared to reference conditions, and used to assess water quality and physical characteristics in this part of Great Seneca Creek.

Results from the pilot water quality-monitoring program at four stations were analyzed and published in "Seneca WWTP Biological and Physical Stream Monitoring Program: Analysis of 1995 Data". Five stations were monitored during the 1998 and 1999 field seasons (March 15th to November 15th). The resulting summary report is included in electronic format on the CD in Attachment A. At each station, data was collected for:

- Stream fish
- Benthic macroinvertebrates
- Aquatic habitat
- Grabs for dissolved oxygen, pH, conductivity, and air/water temperatures
- Continuous recording temperature meters located above and below the WWTP outfall.

The report concluded that there the biological communities and stream resource conditions were similar above and below the outfall. Continued monitoring was recommended as the Seneca WWTP discharge volume increases and thus represents an increasing percentage of the total stream flow, particularly during the low flow months of the year. In addition, temperature monitoring was recommended during the spawning months of March, April, and May to see if there are temperature increases associated with discharge volume increases that could negatively affect fish species spawning.

F2. Selected Restoration Watershed

The Permit requires the County to track progress and evaluate effectiveness of implementing programs and projects to restore a drainage area "equaling ten percent of Montgomery County's impervious area that has not been treated to the maximum extent practicable". A detailed assessment of the selected area and a restoration schedule will be submitted by January, 2003 as required in the Permit.

The drainage area mapping is not yet complete for all stormwater management facilities, so an estimate was used to develop the acreage goal for restoration during the first Permit period. This figure will be refined to more accurately represent controlled versus uncontrolled imperviousness prior to selection of a second area for Permit-required restoration.

Using the year 2001 estimate, there are about 132,089 developed acres in the County. Of this, about 47% has existing stormwater management, either or both quantity and quality control. The estimate for uncontrolled, developed area is therefore 69,886 acres. Using an average imperviousness of 20% for all developed land (residential, commercial, and industrial) provides an estimate of 13,977 acres. The 10% restoration goal for the first Permit period will therefore be 1,398 acres, slightly more than two square miles.

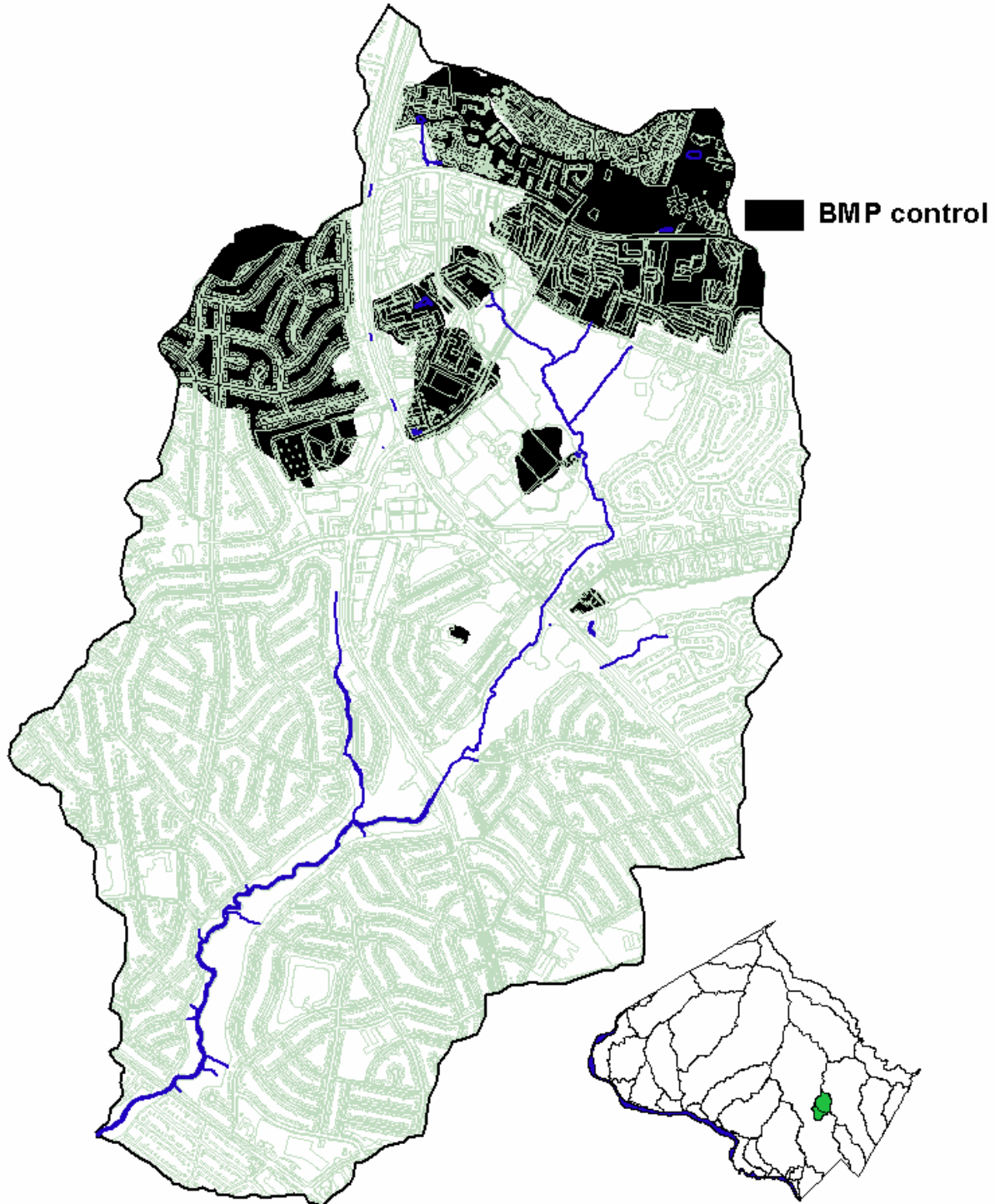
The Turkey Branch subwatershed has been selected as the first area for Permit-required restoration project implementation and tracking. As shown in Figure III-8, this subwatershed is in the Rock Creek Watershed. The Rock Creek Watershed Restoration Study was completed during 2001, and included an inventory of potential stormwater management and stream restoration projects to address identified impairments in the Turkey Branch subwatershed.

The Turkey Branch subwatershed includes about 2,434 acres, with an impervious area of about 706 acres (about 29%). Of the total watershed acreage, only about 16.5% is covered by either stormwater quality or quantity control. Dry ponds, which represent about 60% of the controlled drainage area, are the predominant BMP type in the subwatershed. Dry ponds are designed for runoff quantity control and provide little water quality benefits.

Proposed restoration projects include retrofits of existing dry ponds for quality control, new facilities for quantity and quality control, and over 7,000 linear feet of stream restoration to mitigate flow impacts and improve instream habitat. When construction is complete, the combined stormwater and stream restoration projects will provide water quantity and quality benefits for about 80% of the watershed.

There will be accompanying stream resource condition monitoring, including biological assessments and physical habitat evaluations, to document the extent of water quality and instream habitat benefits from these implemented projects. These monitoring results will be used for modifying future project designs to address specific identified instream impairments.

FIGURE III-8. Turkey Branch Subwatershed: Impervious Areas and Extent of Existing Stormwater Management Controls.



G. Program Funding

The Permit requires the County to submit a fiscal analysis of its expenditures and maintain adequate program funding to comply with all conditions of this permit. Table III-8 compares expenditures in fiscal year 2002 (FY '02) with those budgeted for FY '03. The County's fiscal year runs from July 1 of one year to June 30 of the next. The funding under Watershed Restoration for watershed assessments, project identification, and project construction represent the single largest category of total expenditures, about 45% in FY '02 and budgeted to be about 49% for FY'03.

TABLE III-8. Montgomery County's Funding for Fiscal Years 2002-2003 (FY'02 and FY'03) for Permit-required Programs. (CIP=Capital Improvement Program).

| PERMIT CATEGORY | Thousand \$s by fiscal year | |
|---|-----------------------------|---------------|
| | FY '02 | FY '03 |
| C. Source Identification | | |
| Storm Drain Inventory | 33 | 140 |
| D. Discharge Characterization | | |
| Outfall and Instream Station Water Chemistry Monitoring | 38 | 50 |
| E. Management Programs | | |
| Stormwater/Sediment Control Casework Management | 353 | 369 |
| Plan Review-Stormwater Management and Sediment/Erosion Control | 817 | 864 |
| Maintenance Inspections | 834 | 989 |
| Stormwater Facility Repairs | 487 | 1,005* |
| <i>operating</i> | 26 | 26 |
| DEP Public Outreach and Coordination | 317 | 333 |
| Water Quality Discharge Law Enforcement | 224 | 246 |
| Inspection-Stormwater Management and Sediment/Erosion Control | 853 | 945 |
| F. Watershed Restoration | | |
| Baseline and Reference Stream Monitoring (includes integrated monitoring for Discharge Characterization and Design Manual monitoring) | 571 | 574 |
| Countywide Groundwater Monitoring Program | 160 | 185 |
| Watershed Assessments and Action Plans (includes inventories, planning studies, project design, and construction): | | |
| <i>CIP</i> | 3,876 | 5,395 |
| TOTAL | 8,589 | 11,121 |

* Reflects establishment of Water Quality Protection Charge to fund phase-in of public maintenance responsibility for privately-owned residential facilities.

Water Quality Protection Charge

On November 20, 2001, the Montgomery County Council voted unanimously to pass Bill 28-00 which provides for a consistent source of funding for stormwater facility maintenance. The legislation provides for the transfer of maintenance responsibilities from private property owners to a county program. All residential facilities and stormwater management structures owned by nonresidential property owners that drain to a residential facility, referred to as Associated Nonresidential property owners, will be eligible for the program. The program will be using a phased in approach, transferring all residential and Associated Nonresidential structures into the program over six years.

In December of 2001, the County Executive signed Executive Regulation 11-00, Guidelines for Stormwater Management Loan Program. These guidelines are to be used in providing loans to property owners who need financial assistance to restore their stormwater management facilities to acceptable design standards. Property owners will have to repair their facilities to an acceptable condition based on an inspection or as-built standards before the transfer of maintenance responsibility to the County can occur.

Bill 28-00 also authorizes the Water Quality Protection Charge (WQ Charge) which is a line item on residential and Associated Nonresidential property owner tax bills. The revenue raised from the WQ Charge will be placed in a Water Quality Protection Fund which will pay for structural repair of stormwater maintenance facilities. The nonstructural maintenance will remain the responsibility of the property owner.

The DEP conducted an extensive outreach campaign which included seven public meetings to provide affected property owners with information about the new funding program. Copies of Bill 28-00, Executive Regulation 11-00, and an example information packet is included in Attachment E.

The rate for the WQ Charge for FY03 will be \$12.75 which will be paid by all residential property owners and Associated Nonresidential property owners. The charge is based on the median of a statistically valid sample of the square footage of imperviousness of roofs, walk ways and driveways of residential properties across the County. The median square footage is 2406 square feet and is referred to as the Equivalent Residential Unit or ERU and will serve as the base unit for the charge.

Associated Nonresidential properties will be billed based on a calculated square footage of imperviousness of building "foot print", walkway and parking lot using aerial photos and GIS. The total square footage of imperviousness will be divided by the ERU then multiplied by the rate to calculate the charge. Residential single family attached structures such as town homes, because of less imperviousness, will be charged 1/3rd of the ERU. Condominiums and other multifamily residences will be charge based on an actual calculation of their imperiousness similar to the Associated Nonresidential structure and their charge will be calculated by dividing the total charge by the number of units.

The rate will be set by the County Council on an annual basis and after a public hearing and will most likely increase with program needs. The current Charge provides for maintenance of residential structures during the first year. In the future, a wide variety of stormwater program

requirements could be added for coverage under the Charge, including: inspection and maintenance of the storm drain conveyance system; maintenance of Associated Nonresidential structures; or a credit program where by property owners could receive a credit (i.e. a reduced charge) for implementing nonstructural BMPs.

H. Assessment of Controls

Pollutant Loads Reductions

The permit requires the County to annually submit estimates of expected pollutant load reductions as a result of its proposed management programs. As in previous years, the estimates presented in this report will be limited to those from structural best management practices.

Reductions were calculated using the assigned percent reductions by type of facility as shown in Table III-9. Two reductions were assigned: one for the nitrogen compounds and one for all other compounds, assuming that the behavior of the other pollutants more closely followed that for particulates.

The factors shown in Table III-9 were taken from information provided by DPS to the Patuxent Demonstration Project's Urban BMP workgroup in 1994. Five major types of stormwater management facilities are considered: dry ponds, extended detention dry ponds, wet ponds, infiltration structures, and separators/sand filters.

TABLE III-9. Pollutant Reduction Factors by Stormwater Management Structure Type.
(From information compiled by Urban Best Management Practice Workgroup for
Patuxent Demonstration Project, 1994).

| PARAMETER | BOD5 | TKN | NO23 | TP | CD | CU | PB | ZN | TSS |
|---------------------------------|------|------|------|------|------|------|------|------|------|
| Dry Ponds | 0.20 | 0.10 | 0.10 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| Extended Detention Dry Ponds | 0.30 | 0.20 | 0.20 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 |
| Wet Ponds | 0.60 | 0.45 | 0.45 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 |
| Infiltration | 0.70 | 0.60 | 0.60 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Separators/ Sand Filters | 0.55 | 0.5 | 0.50 | 0.55 | 0.55 | 0.55 | 0.55 | 0.55 | 0.55 |

A summary by major Tributary Basin and BMP type is shown in Table III-10. for data available through 2001. The Potomac Tributary Basin is the more developed and thus has the greatest number of facilities in every category. Dry ponds account for the greatest number of facilities of one type, being the earliest type of facility implemented. The miscellaneous category includes controls such as dry wells and underground detention structures which control very small areas.

These numbers reflect only the most downstream facility from sites where there is a pre-treatment train with multiple facilities or facilities in series (e.g. to oil-grit separator for pre-treatment before discharge to extended detention dry pond.) Consequently, the total number of oil-grit separators, sand filters, and infiltration structures which have actually been constructed and need to be maintained is much higher than shown in this table. Similarly, the total pollutant reductions are likely higher because of the cumulative treatment effects which are not currently being considered.

Despite the large difference in amount of development of the two Tributary Basin watersheds, the percent of developed areas with stormwater controls is about 47% in both major watersheds. The developed acres shown here include large-lot subdivisions (from two to five-acre lot size). These were largely exempt from post-construction stormwater management until the 2001 adoption of the new State Stormwater regulations.

TABLE III-10. Number and Type of Stormwater Management Structures in Montgomery County in 2001.

| STRUCTURE TYPE | NUMBER OF STRUCTURES | |
|---------------------------------------|-------------------------|------------|
| | <i>Tributary Basin:</i> | |
| | Potomac | Patuxent |
| Dry Ponds | 706 | 20 |
| Extended Detention Dry Ponds | 39 | 4 |
| Wet Ponds | 324 | 9 |
| Infiltration (Trenches and Basins) | 436 | 24 |
| Separators/Sand Filters | 548 | 19 |
| Miscellaneous | 405 | 11 |
| TOTAL: | 2,461 | 107 |
| % developed in watershed | 44.8 | 11.3 |
| % of developed acres w/control | 47.1 | 47.5 |

Total loads were calculated for the developed portion of the County only, based on residential, commercial, and industrial land uses. The approach used was the Simple Method for calculating stormwater loads based on assumptions about percent of rain events that produce runoff and type of land use. The equation and event mean concentrations are shown in Table III-11. These concentrations are the averages from the storm event monitoring required during the NPDES MS4 Permit Application process and from the Long-Term Discharge Characterization Monitoring at the Colesville Depot facility.

TABLE III-11. Storm Event Mean Concentrations used in Pollutant Loads Calculation.
Means by land use based on Montgomery County NPDES MS4 Part 2 Permit Application (1994-1995) and Long -Term Discharge Characterization Monitoring (1996-2001)

| PARAMETER | CONCENTRATION (mg/l) | | |
|---|----------------------|------------|------------|
| | RESIDENTIAL | COMMERCIAL | INDUSTRIAL |
| BOD5 | 15.7 | 16.2 | 15.8 |
| TKN | 1.5 | 3.08 | 1.33 |
| NO2+NO3 | 0.678 | 0.55 | 0.496 |
| TOT-P | 0.303 | 0.165 | 0.217 |
| CD | 0.002 | 0.0068 | 0.0037 |
| CU | 0.052 | 0.0282 | 0.0300 |
| PB | 0.0242 | 0.0242 | 0.0516 |
| ZN | 0.0942 | 0.147 | 0.0985 |
| TSS | 113 | 98.8 | 245 |
| <p>Load=[(P)(Pj)(0.05+0.009(I))/12]*(C)(A)(2.72) P=annual precipitation in inches=40.9 C=concentration in mg/l Pj=fraction of events that produce runoff=0.9 A=developed drainage area in acres I=imperviousness in drainage 2.72=conversion factor to pounds Residential =0.27 Commercial=0.91 Industrial = 0.51</p> <p><i>From: Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs. T.R. Schueler, 1987. MWCOC.</i></p> | | | |

Table III-12 shows the stormwater delivered loads (lbs/year) from the County's developed acreage. The five major BMPs combined are estimated to reduce the total load from the developed portion of the County from about 16.3% for the nitrogen compounds to about 22% for all other parameters.

The estimated loads also show apparently high heavy metals loads. However, this can be directly attributed to the conservative use of the detection limit for any observation recorded as "below detection limit" during the calculation of the storm event mean. Other studies have set observations at detection limit to zero or one-half the detection limit to calculate storm event means from discrete samples. CD, CU, and PB all had significant numbers of discrete observations recorded as "below detection limit".

Total loads will continue to increase despite an accompanying increase in implementation of stormwater management and stormwater retrofits because BMPs are not 100% effective in reducing pollutants from developed areas. Stormwater pollutant reductions associated with the miscellaneous structural practices shown in Table III-10 are not expected to significantly increase these percentages. Reductions associated with stream restoration and with non-structural practices such as pollution prevention and public outreach will be included as quantitative data becomes available from ongoing research.

TABLE III-12. Stormwater Delivered Loads for the year 2001 (lbs/year) and Reductions from Stormwater Best Management Practices (BMPs) in Montgomery County

| PARAMETER | Total developed (132,089 acres) | After BMPs (62,203 acres under control) | % reduction by BMPs |
|--|------------------------------------|---|---------------------------|
| BOD5 | 6,969,272 | 5,404,743 | 22.4 |
| TKN | 873,384 | 731,251 | 16.3 |
| NO23 | 269,954 | 226,022 | 16.3 |
| TP | 109,157 | 84,653 | 22.4 |
| Cd* | 1,641 | 1,273 | 22.4 |
| Cu* | 18,263 | 14,163 | 22.4 |
| Pb* | 12,165 | 9,434 | 22.4 |
| Zn* | 49,097 | 38,071 | 22.4 |
| TSS | 55,064,221 | 43,151,683 | 21.6 |
| <i>*High values due to setting observations reported as "below detection limit" to the detection limit for purposes of calculating means</i> | | | |

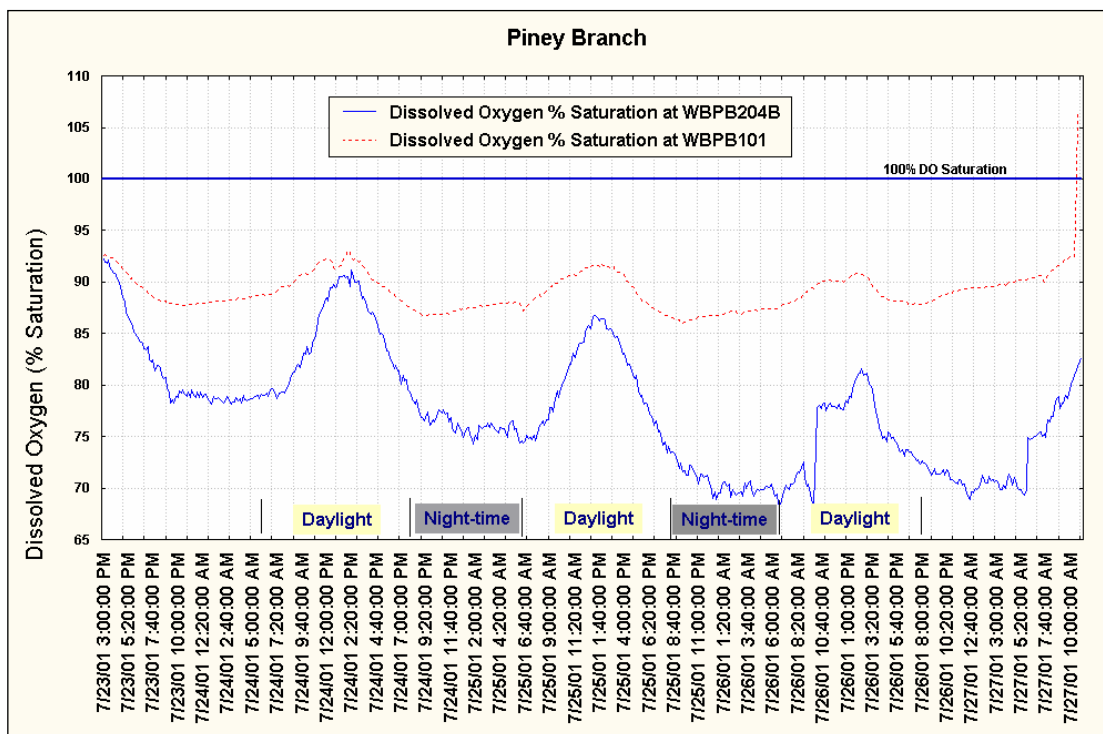
Special Protection Areas Monitoring

During the last Permit period, the County used the results from its Special Protection Areas (SPAs) to assess the effectiveness of BMPs to minimize impacts of development on streams. The County established the SPA program in 1995 to protect high quality streams in watersheds with substantial projected land use changes. The Clarksburg Town Center subwatershed, selected for the required Design Manual Monitoring (in Section III-D. Discharge Characterization), is in one of the County's three SPAs.

Since the SPA program inception, 13 sites have undergone pre-construction monitoring and progressed to the construction phase. Eleven projects have been completed that required BMP monitoring. However, the period of post-construction monitoring has not been long enough to draw conclusions on how well BMP's perform to mitigate impacts to stream water quality.

In the Piney Branch SPA, monitoring seems to already be showing development-related impacts on stream resource conditions. Figure III-9 compares summer dissolved oxygen conditions for two subwatersheds within Piney Branch. The blue line is data collected from a mainstem station (WBPB204B) downstream of significant recent land use changes, newer developments which implemented enhanced site design and stormwater management controls. The red line shows data collected from the Western Tributary station (WBPB101) in a subwatershed with older, mainly residential development.

FIGURE III-9. Comparison of Dissolved Oxygen Conditions.



There is a significant daily pattern of peaks and valleys at the mainstem station not seen in the Western Tributary. This pattern seems to reflect a well-documented phenomenon in aquatic systems, the night-time depletion of oxygen by plant and animal respiration without accompanying plant photosynthesis (and oxygen production) that occurs during sunlight hours. The magnitude of the difference day to night is driven by the amount of plant biomass relative to the animal biomass.

Additional field evaluations indicated that significantly greater amounts of periphyton (substrate-associated plants) and fine sediments were present in the mainstem than in the Western Tributary. This pointed to eutrophication--nutrient enrichment for periphyton growth in the mainstem not evident in the Western Tributary. The County has begun baseflow, grab sample nutrient monitoring at a network of stations throughout the Piney Branch SPA to identify any specific areas, and their land uses, that are contributing to this eutrophication problem in the mainstem. Possible nutrient pathways include:

- increased stormwater runoff from the new developments and an accompanying increase in nutrients reaching the streams;
- increased fertilize use from the new developments with the excess fertilizer either:
 - reaching the streams in stormwater runoff or
 - infiltrating down through the soil into subsurface flows or to groundwater and then being delivered to the stream through springs and seeps;
- from leaking septic systems or sewer lines, or from animal waste, whether wildlife or domestic pets;
- binding to fine-grained sediments that are discharged from sediment control ponds and then subsequently tranformed back to soluble components readily available for plant uptake.

Baseflow and Storm Event Pollutant Loads

Stormwater management retrofits such as those constructed at the Colesville Depot are designed to reduce flow and pollutant impacts from wet weather events. Baseflow contributions of pollutants, particularly nitrogen, can be substantial in watersheds where the majority of the total annual flow is not storm-derived. A more detailed analysis was conducted on the year 2000 water chemistry monitoring data to evaluate the relative baseflow to stormflow contributions. The year 2000 was normal in terms of long-term annual average rainfall for Maryland and was the last complete year of water chemistry monitoring in the Upper Good Hope.

The Upper Good Hope continuous flow data was partitioned into baseflow and into storm events based on rise in stream height at least 10% higher than baseline. Loads for monitored storm events were calculated using the measured total flow and event mean concentration for each event; loads for unmonitored storm events were calculated using accumulated stormflow volume (minus monitored stormflow volume) and the average storm event mean concentration for the year 2000; loads carried during baseflow were calculated using total baseflow volume and the average concentration of all baseflow samples for the year 2000.

Figure III-10 compares total time and total flow by flow type (baseflow vs stormflow). Baseflow occurred 80% of the time and accounted for 76% of the total flow during the year 2000. As shown in Figure III-11, this relative proportion was not necessarily carried over in the total pollutant loads. For nitrate (NO₃) and total kjeldahl nitrogen (TKN), baseflow accounted for about 74% of the total annual load. However, for total suspended solids (TSS), only 7% of the total annual load was carried during baseflow. Ninety-three percent of the total annual load was carried during storm events. Similarly, 78% of the total phosphorus annual load was carried during storm events.

This relative pattern between dissolved and particulate components has been well-documented, with pollutants associated with sediment disturbance showing a closer relationship to storm events than to baseflow volumes. Stormwater management and retrofit project implementation is expected to control particulate-associated pollutants. Baseflow contributions will also need to be considered if restoration and management strategies are to be successful in meeting specific instream levels for pollutant total maximum daily loads (TMDLs). The County has begun addressing this issue of baseflow contribution through synoptic nutrient surveys conducted during the first Permit, ongoing targeted surveys in subwatersheds with suspected nutrient impairment, planned nutrient monitoring associated with stream restoration projects, and implementing the recommendations of its Groundwater Protection Strategy.

The Groundwater Protection Strategy, published in November 2001, was developed to protect public health and the integrity of groundwater and of surface watersheds. The DEP is in the process of designing and implementing a groundwater monitoring program to provide a baseline of existing water level and water chemistry conditions. A "rotating watershed" approach will be used so that all areas of the County will eventually be monitored and then re-visited on a regular basis. The groundwater monitoring program will be crucial in protecting groundwater supply, groundwater quality, and stream baseflow conditions. This new initiative is yet one more element needed for the long-term success of the County's integrated water resources protection and restoration programs.

FIGURE III-10. Upper Good Hope. Baseflow and Stormflow Comparison for Total Time and Total Flow Volume during the Year 2000.

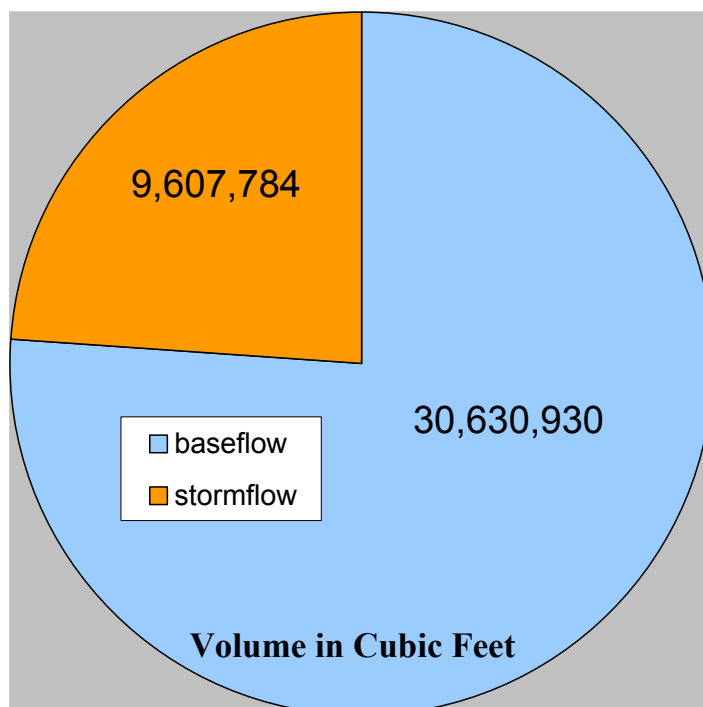
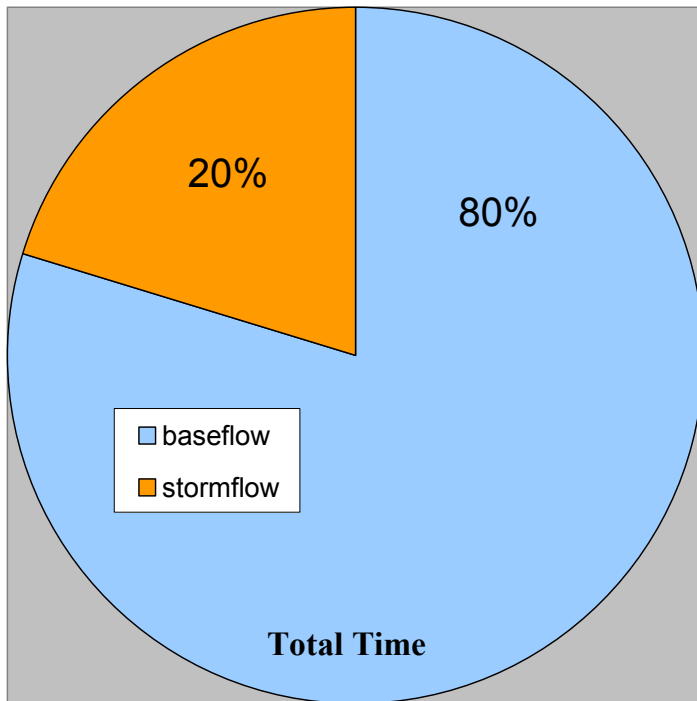
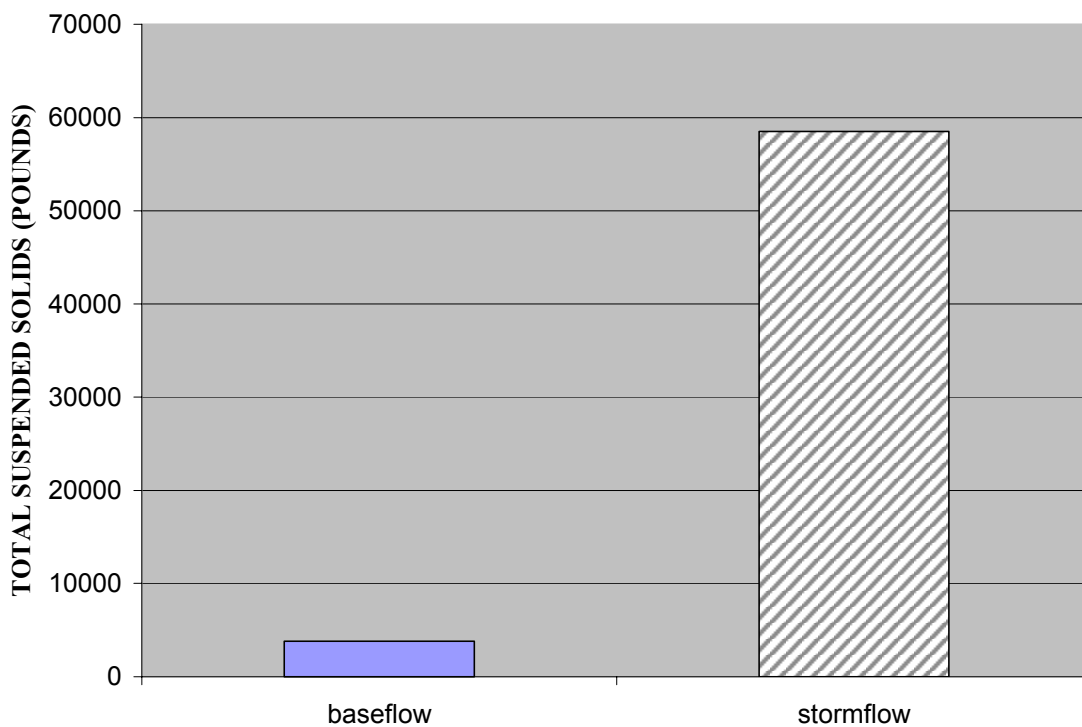
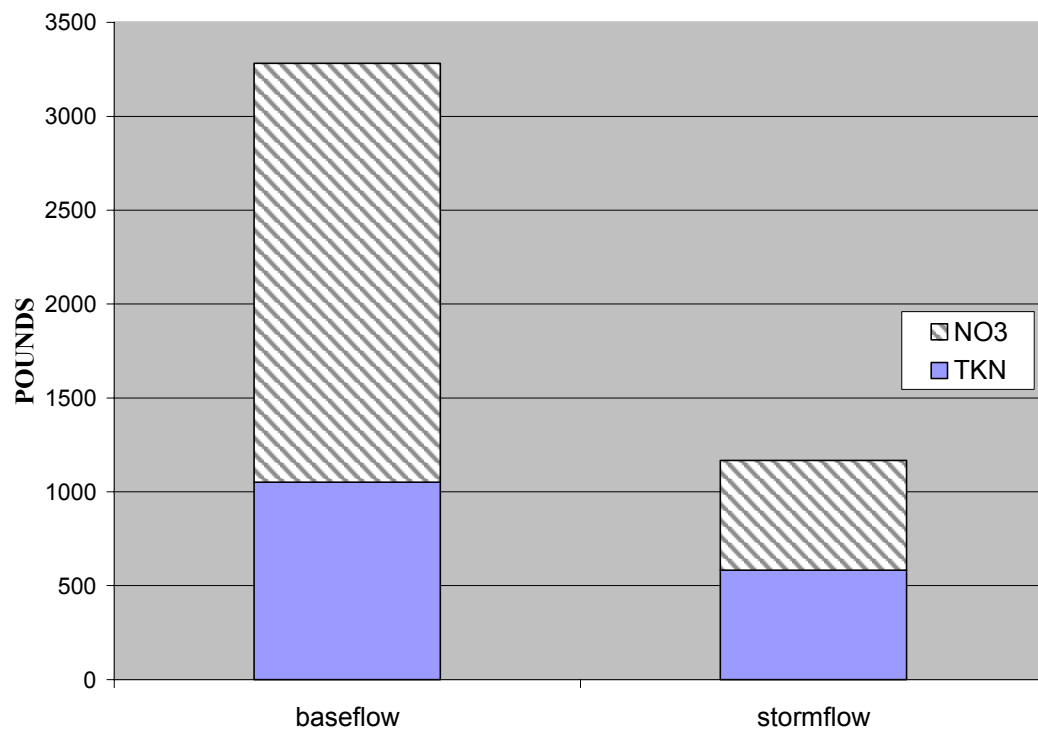


FIGURE III-11. Upper Good Hope. Baseflow and Stormflow Comparison for Nitrogen and Total Suspended Solids Loads During the Year 2000.



PART IV. SPECIAL PROGRAMMATIC CONDITIONS

The Permit requires that the County assist with the implementation of the Tributary Strategies to meet nutrient reductions goals for the Tributary Basins that it lies within. These are the Middle Potomac and the Patuxent River Tributary Basins. During 2001, the County routinely attended and participated in the activities of both the Middle-Potomac Tributary Team and the Patuxent River Commission. The County also continues to participate in a broad range of regional watershed efforts, including the Anacostia Watershed Restoration, the Patuxent Reservoirs Watershed Protection, and the Programmatic Coordination Committee of the Maryland Water Monitoring Council.

RELATED DOCUMENTS:

- Rock Creek Watershed Restoration Action Plan, 2001
- Great Seneca Wastewater Treatment Plant Study Annual Report, 1998-2000
- Great Seneca Creek Watershed Study, 2002
- Street Sweeping for Pollutant Removal, 2002

All of the documents cited above are available online in PDF format on our askDEP.com website. In addition, the Department of Environmental Protection maintains an extensive collection of annual, technical, and general reports, public information factsheets, and related publications. Many are available in both PDF and HTML format, and in some cases, print copies of documents are available. Please contact us for more information.

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